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Assessment Quality: Sales Ratio Analysis of Residential Properties in Indiana

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Key Points

The analysis of sales ratios presented here shows that...

- Low-value residential properties tend to be over-assessed, and high-value properties tend to be under-assessed. This trend persists statewide.
- Residential properties with sales prices between $100,000 and $200,000 tend to have the most uniform assessments over time.
- These results have implications for property tax payments. Owners of over-assessed residential properties face higher property tax payments than they would pay if assessed values were closer to market values. Similarly, owners of under-assessed residential properties pay lower property tax payments than they would if assessments were closer to market values.

Additional work is needed to explore why these discrepancies exist and to identify methods to reduce them.

Background

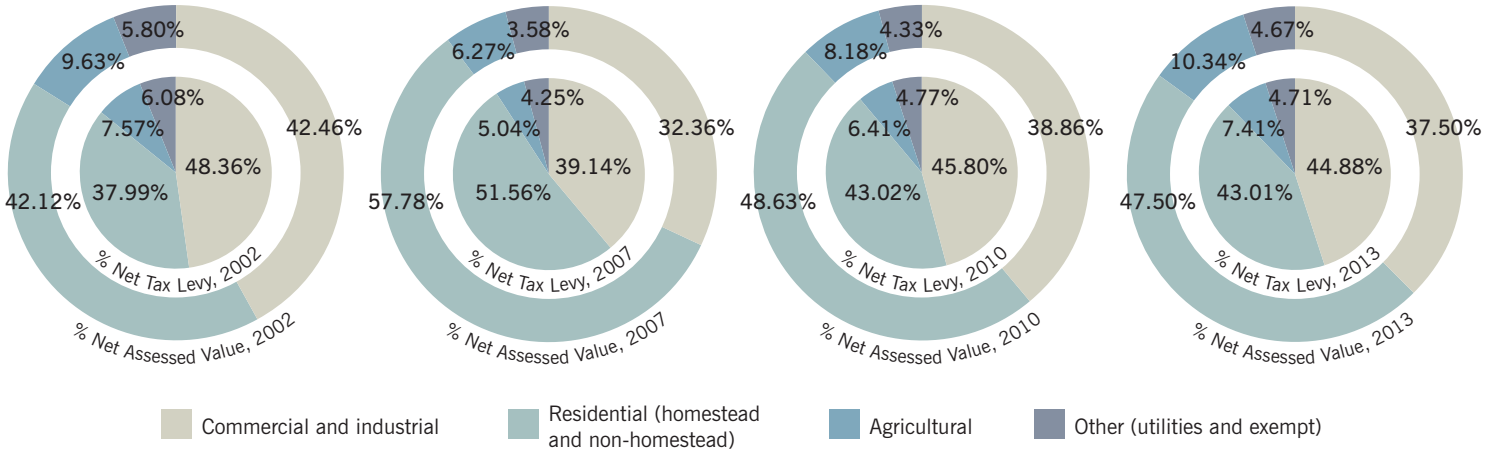
In October 2005, the Indiana Fiscal Policy Institute (IFPI) released "Statewide Property Tax Equalization Study," a policy report conducted to examine the impacts of the court-ordered mass reappraisal that had been implemented in the early 2000s. The study also evaluated the property tax restructuring that was implemented to mitigate tax shifts that had resulted, in part, from the mass reappraisal. The IFPI study used 2003 property tax data to evaluate whether "a uniform and equal rate of assessment" as required by the Indiana Constitution had been achieved and found that it had not.

One recommendation of the study was the construction of annual data sets with sales data and property tax data so that regular sales ratio studies could be performed at the state level. Such a system has since been implemented at the state level through the Indiana Department of Local Government Finance (DLGF).[1] The sales ratio data collected by counties each year and made available through the DLGF website shows the sales ratio for properties sold each year (both residential and business), sale price, assessed value and the mean and median sales ratio along with other descriptive statistics by township and type of property.

The Indiana General Assembly continued to restructure the state's property tax system, passing a law to implement property tax rate caps in 2008. Other changes included a reduction in the total number of assessing units from 1,008 units down to 105 units as township assessment duties were taken over by the county assessor in most counties. The 105 assessing units currently operating include 92 county assessors and 13 township assessors in townships with 15,000 or more parcels.[2]

1. Ratio reports for each county are available through the DLGF website at http://www.in.gov/dlgf/2339.htm.
2. Referenda were held in November 2008 for voters to decide whether 43 townships in the state with 15,000 or more parcels should transfer to the county assessor or keep a township assessor. Thirty voted to transfer to county assessment, while 13 voted to keep township assessment. Those counties still with township assessors are Allen, Elkhart, Howard, Lake, LaPorte, Porter, St. Joseph, Vigo, and Wayne counties.

Figure 1. Percent Net Assessed Value vs Net Assessed Tax, 2002-2013



Source: Author calculations from Indiana Legislative Services Agency: Indiana Handbook of Taxes, Revenues and Appropriations, various years.

In this policy brief, we focus on the property tax base (gross assessed value), and we provide a detailed examination of the uniformity of property tax assessment in the state. We do so in three parts. First, we explain measures of uniform assessment and describe the data used in this analysis. Second, we report results of our analysis in the context of property types, home values, and geography. Finally, we summarize our results and offer recommendations regarding further study of property tax issues in Indiana.

Uniformity of Assessment

To measure uniformity, we use three common measures—the sales ratio, the coefficient of dispersion (COD), and the price-related differential (PRD). The sales ratio is the most commonly used measure of the uniformity of assessment and is widely used in equalization analysis. It is calculated as assessed value divided by sales price (*Equation 1*).

$$\text{Sales Ratio} = \text{Gross Assessed Value} \div \text{Sales Price} \qquad \text{(Equation 1)}$$

We present both the mean and median of the sales ratio. A sales ratio greater than 1.0 means the property is over-assessed—the assessed value is higher than the sales price. A sales ratio less than 1.0 means the property is under-assessed—the assessed value is lower than the sales price. In the analysis that follows, we present the mean and median sales ratios for various time periods and geographies. Both are measures of central tendency. The mean is sensitive to outliers while the median is not. The International Association of Assessing Officers (IAAO) standard for median assessment ratios is a figure within 10 percent of market value (sales price), which equates to a ratio between 0.9 and 1.1.

An alternative uniformity metric is the coefficient of dispersion (COD), which measures variation around the median ratio.[3] A high coefficient of dispersion suggests a lack of uniformity among assessments. The lower the COD, the more uniform are the assessments. A COD around 15 is the IAAO standard.

We also calculate the price-related differential (PRD) for various time periods and geographies.[4] The PRD is another measure of assessment uniformity and provides information on the progressivity or regressivity of assessments. According to IAAO standards, a PRD below 0.98 indicates that higher-valued properties tend to exhibit higher assessment ratios than lower-valued properties, which suggests a possible bias in favor of lower-valued properties. A PRD larger than 1.03 indicates that higher-valued properties tend to exhibit lower assessment ratios than lower-valued properties (under-assessment of higher-valued properties), suggesting a possible bias in favor of higher-valued properties.

IAR Data Set

The data set used in this analysis is from the Indiana Association of REALTORS® data warehouse and is the result of a collaboration among the Indiana Association of REALTORS®, Inc.; the Indiana Business Research Center; and Seven Opals Software, LLC to match 2005 through 2012 real estate sales data from the multiple listing service (MLS) with property tax data from the DLGF.

This data set covers the sale of residential properties only. Residential properties made up about 47 percent of net assessed value and 43 percent of the net tax levy (including residential homestead, agricultural homestead, and non-homestead residential) in year 2012-pay-2013. Commercial, industrial, utility, and non-homestead agricultural properties, which make up the balance of the property tax base and levy in the state, are not considered in this analysis. *Figure 1* shows the share of net assessed value and the property tax levy associated with the four broad property classes. During 2007, the period prior to the General Assembly's passage of property tax caps and other restructuring of the

3. The coefficient of dispersion (COD) is calculated using the following steps: (1) Calculate the difference between each individual sales ratio and the median ratio and take the absolute value. (2) Sum the differences and divide by the total number of sales in the group. This is the average deviation. (3) Divide the average deviation by the median sales ratio and multiply by 100.

4. The price-related differential (PRD) is calculated as the ratio of the mean sales ratio to the sales weighed mean assessment ratio.

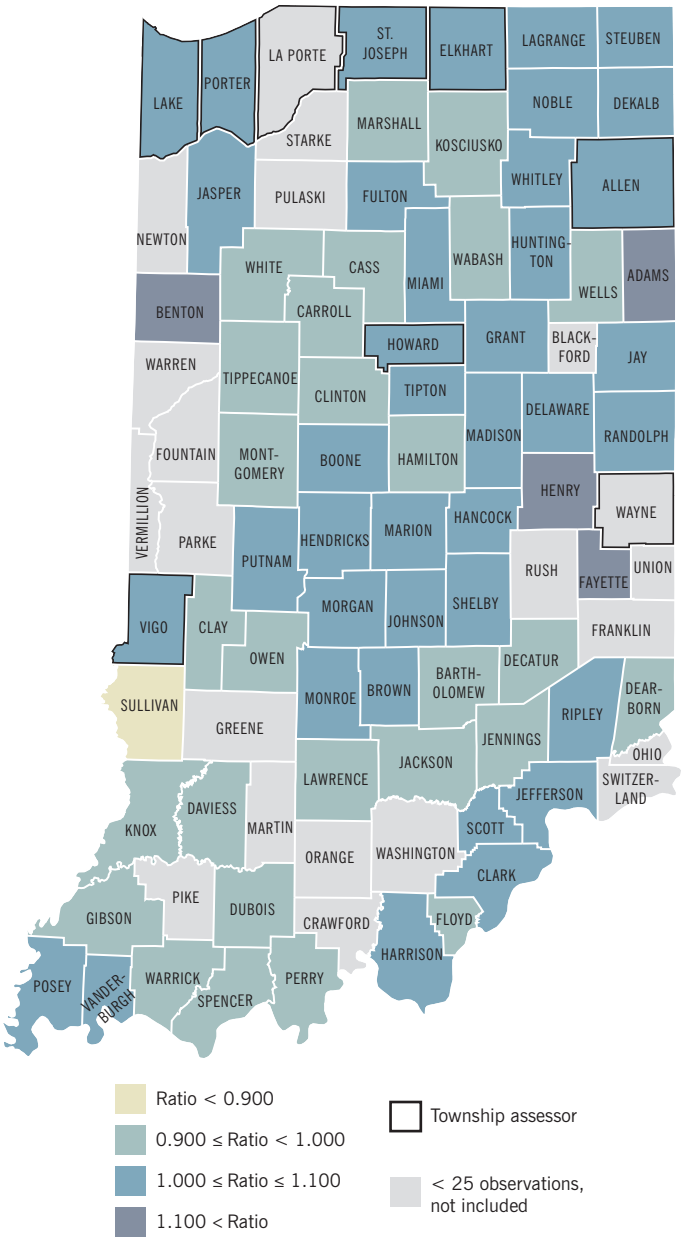
property tax system in the state, the residential share of assessed value and the levy peaked and has decreased with the implementation of property tax caps, but it was still higher in 2013 than 2002. The share of assessed value and the levy attributable to commercial and industrial properties was lower in 2013 than 2002.

There were major changes in Indiana's property tax system during the 2005-2012 period covered by this data. Trending of assessments was implemented in 2007 as a means to bring assessed value closer to the market value of property. In 2008, property tax rates on homesteads were capped at 2.0 percent of gross assessed value. The rate caps were phased in for all property classes in 2009, with rate caps of 1.5 percent on homesteads, 2.5 percent on other residential, commercial apartments, and farmland; and 3.5 percent on all other real and personal property (primarily business property). Rate caps were fully implemented in 2010 at 1.0 percent on homesteads, 2.0 percent on other residential, commercial apartments, and farmland; and 3.0 percent on all other real and personal property. The Great Recession, which corresponded with the bursting of the housing bubble, began in late 2007 and was officially over in June 2009. These legislative and economic changes influenced assessments, tax rates, and market prices of homes in complex and regionally heterogeneous ways.

The Great Recession led to an unusually high number of home foreclosures, sales of which might be delayed for non-market reasons (slow administrative processes, etc.) To correct for this, we removed some observations from the data set. For the sales ratio analysis we removed properties that did not sell, had a sales price lower than $10,000, or had a gross assessed value lower than $10,000. This sample is referred to as the "untrimmed sample" in the analysis that follows.

We further "trimmed" the data set using IAAO "Outlier Trimming Guidelines". We refer to this sample as the "trimmed sample" in the analysis that follows. This data trimming technique removed a substantial number of properties selling for less than $50,000.[5] Thus we removed many properties that were likely to be foreclosure and distressed sales. Through this trimming procedure, properties with sales ratios less than 0.3662 (2,021 properties) and properties with sales ratios larger than 1.8023 (36,392 properties) were removed from the data set. The MLS does not explicitly identify foreclosed properties, and many foreclosed properties may be sold outside the MLS system. A more detailed study of these properties could reveal their influence on surrounding homes, which would be an indication of a distressed sale, but for our purposes of evaluating the uniformity of assessment, removing them from this analysis is appropriate.

Figure 2. Median Sales Ratios, Trimmed Sample, 2012



Note: More complete data is shown in *Appendix Table A4*.

Source: Author calculations from IAR data warehouse.

The legislative and economic changes beginning in 2007 influenced assessments, tax rates, and market prices of homes in complex and regionally heterogeneous ways.

5. The number of properties selling within the $10,000 to $30,000 range was reduced from 27,506 in the untrimmed sample to 5,368 in the trimmed sample (see *Table 2*). The number of properties selling within the $30,000 to $50,000 range was reduced from 23,287 in the untrimmed sample to 13,634 in the trimmed sample.

Table 1. Descriptive Statistics for Under- and Over-Assessed Properties, 2005-2012

UNTRIMMED SAMPLE										
	Under Assessed					*Over Assessed*				
Year	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations
All years	*19.28*	*22.69*	*3.41*	*283.44*	*137,977*	*21.06*	*16.75*	*-4.31*	*311.79*	*163,091*
2005	3.08	3.96	0.88	65.05	25,391	0.90	0.74	-0.16	21.92	9,747
2006	2.08	2.45	0.37	43.49	16,792	1.86	1.54	-0.32	43.78	16,253
2007	2.60	3.09	0.49	50.12	18,510	1.87	1.57	-0.30	38.95	14,605
2008	2.16	2.50	0.34	22.63	14,888	2.52	2.04	-0.48	31.99	18,911
2009	2.19	2.52	0.33	22.46	15,764	3.69	2.84	-0.85	44.49	27,363
2010	2.41	2.77	0.36	26.41	16,359	3.38	2.63	-0.75	42.87	24,842
2011	2.16	2.46	0.30	23.67	13,923	3.50	2.74	-0.76	43.86	25,921
2012	2.59	2.94	0.35	29.60	16,350	3.35	2.65	-0.70	43.93	25,449

Note: See *Appendix Table A1* for data in the trimmed sample.

Source: Author calculations from IAR data warehouse.

Results

Over- and Under-Assessed Properties

Table 1 displays aggregate data on gross assessed value, sales price (market value), and the gross tax levy of under- and over-assessed properties for the untrimmed sample. The trimmed sample statistics are found in *Appendix Table A1*. Over-assessed properties are those with sales ratios larger than 1.0, indicating that gross assessed value is higher than the sales price. Under-assessed properties are those with sales ratios smaller than 1.0, indicating that the gross assessed value is lower than the sales price.

In the untrimmed sample, the number and aggregate value of over-assessed properties (sales ratio > 1.0) increased over the 2005-2012 time period, peaking in 2009, while the number and aggregate value of under-assessed properties (sales ratio < 1.0) tended to be lower but more variable. While the housing bubble in the Midwest was not as extreme as in other parts of the country, sales prices lower than assessed values may reflect decreases in market prices while assessed value lags market price. We believe this especially likely because the peak coincided with the depth of the Great Recession, though a full-scale estimate of the impact of the Great Recession on Indiana housing values and stock is outside the scope of this study. It also appears that during the recession and slow recovery, assessed values are more likely to be higher than sales prices. In short, during the period of dramatic legislative change and the Great Recession, it seems highly unlikely that assessment in Indiana would perform well in terms of uniform assessment. The evidence presented here suggests it did not.

Before 2008, the number and gross assessed value of over-assessed properties were lower than that of under-assessed properties. From 2008 onward, this relationship flipped. The number and gross assessed value of over-assessed properties (sales ratio > 1.0) was higher than that of under-assessed properties. We are unable to distinguish between the effects of the recession and various property tax changes implemented around 2008 on sales ratios.

Sidebar 1. Three Assessment Scenarios

- A family buys a house for $60,000, and finds that the gross assessed value on this property is $81,900 with a gross tax due of $819 if the property is taxed at 1.0 percent. If assessed value had been equal to the sales price, the gross tax due would be $600. The gross property tax payment is $219 more than it would have been if the assessed value were equal to the sale price.
- A family buys a house for $140,000. The assessed value is likely to be $143,780 so the gross tax due would be $1,438 if it is taxed at 1.0 percent. If assessed value has been equal to the sale price tax due would be $1,400—a $38 difference.
- A family buys a house for $300,000, but finds that the assessed value is $286,500. So, the gross tax due would be $2,865 instead of $3,000 if assessed value equaled the sales price. The annual difference is $135.

Due to differences between assessed value and sale price, the family that buys the $300,000 house owes $135 *less* in taxes and the family in the $60,000 house owes $219 *more* in property tax.

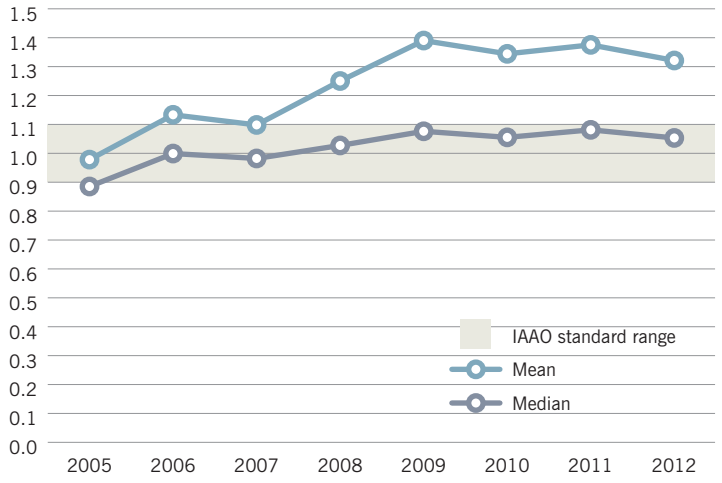
Note: Differences between market and assessed value are calculated using the mean sales ratio for homes in these price ranges reported in *Table 7*.

Properties that are over-assessed will end up paying more property taxes than similar properties that are under-assessed. With property tax caps, 1.0 percent of an over-assessed property will be higher than 1.0 percent of a similar under-assessed property. See *Sidebar 1* for an illustration. A similar relationship will hold for the residential rental units that are over-assessed and fall under the 2.0 percent rate cap. Local government revenue also is higher with over-assessment than if the sales ratio were closer to 1.0.

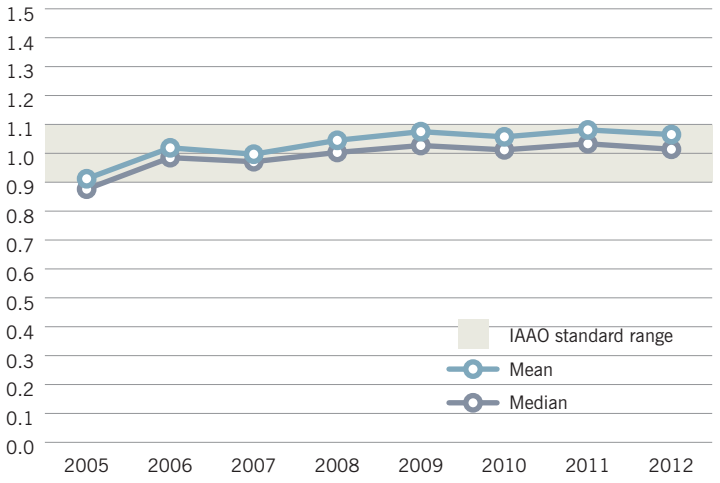
There are also implications for other property classes. The over-assessment of residential properties, which fall under the 1.0 percent and 2.0 percent rate caps, will be advantageous to other property types, which fall under the 2.0 and 3.0 percent rate caps. The over-assessed residential properties will pay a larger portion of the tax

Figure 3. Sales Ratios by Year, 2005-2012

A. Untrimmed Sample



B. Trimmed Sample



Source: Author calculations from IAR data warehouse.

burden than they would if they were not over-assessed, which will lower the proportion of the tax burden paid by other property classes.

The revenue implications of this over- and under-assessment are difficult to calculate. An increase in the assessed value of higher valued properties would lower property tax rates, while a decrease in the assessed value of lower value properties would increase rates. Each of these changes would affect how the tax caps affect the property tax levy. Incorrectly assessed values cause unpredictable impacts on taxpayers and local government budgets.

Sales Ratios

Second, we compare sales ratios among years, sales price categories, and counties. When examining sales ratios by year, the mean sales ratios for the untrimmed sample indicates that, with the exception of 2005, properties are over-assessed for all years—gross assessed value is higher than the sales price. See *Figure 3* and *Appendix Table A2*.

While the median values of the sales ratio are generally within IAAO standards, the mean sales ratio is higher than the median across years for both the full sample and the trimmed sample, indicating that there are sales ratios greater than 1.0 that are outliers or extreme values. The coefficient of dispersion (COD) for the entire sample is higher after 2008, indicating less uniformity among assessments in later years for the entire sample. A price-related differential (PRD) that is higher than 1.03 indicates that properties with higher sales prices tend to be under-assessed while properties with lower sales prices are over-assessed, suggesting that the assessment tends to be regressive.

Next we turn our attention to an examination of sales ratios for properties with differing market values. We construct 10 sales price categories to complete this analysis.[6] Our examination of the sales ratios by sales price categories (see *Appendix Table A3*) shows that lower value properties tend to be over-assessed, while higher value properties tend to be under-assessed—confirming the regressivity of assessment as suggested by the PRD.

Before 2008, properties with sales prices lower than $50,000 had median sales ratios farthest from 1.0. Since 2008, properties with sales prices lower than $70,000 have median sales ratios farthest from 1.0. Properties with sales prices higher than $1 million also stand out as having less uniform sales ratios. While the property tax caps do not directly affect assessed value, the data suggests that sales ratios were less uniform over more sales categories after tax caps were implemented. The COD tends to be higher for the lowest and highest value properties, indicating more variability in the sales ratio. Properties selling for less than $100,000 and more than $300,000 tend to have a COD higher than the acceptable range of 15.

The lack of uniformity in assessments at each end of the distribution has fairly straightforward explanations. This lack of uniformity likely occurs because properties at the low and high ends of the distribution are the most difficult to assess—there are fewer properties in these categories with which to make comparisons. Moreover, these properties likely experience greater variation in quality, size, and other factors that influence value, but which are not easily captured by data employed by an assessor.

In the 2012 trimmed sample (see *Table 2* next page), the median sales ratio was 1.46 for properties in the $10,000 to $30,000 sales price category and 0.86 for properties that sold for more than $1 million. During 2012, the median sales ratios are closest to 1.0 for properties with sales prices between $100,000 and $200,000. For properties selling for less than $100,000, assessed value is 11 percent to 40 percent higher than the sales price (mean). In contrast,

6. The sales price categories used in this analysis correspond to the house value categories used in the American Community Survey. If there were not at least 25 observations in the highest sales category, it was merged with the next highest category, so that for some tables there are only nine categories.

Table 2. Sales Ratios by Sales Price Category, 2012

Price Range	2012 SALES PRICE							
	Sales Ratio, Untrimmed Sample				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.9287	2.7392	32.9555	4,112	1.4090	1.4654	16.4854	635
$30,000 ≤ price < $50,000	1.8743	1.8295	27.4597	3,452	1.3544	1.3935	18.2207	1,647
$50,000 ≤ price < $70,000	1.3810	1.3207	26.5572	3,753	1.2403	1.2271	20.6028	3,152
$70,000 ≤ price < $100,000	1.1477	1.0913	19.4422	6,816	1.1192	1.0828	17.2458	6,589
$100,000 ≤ price < $150,000	1.0292	1.0075	12.5020	10,763	1.0265	1.0072	12.0551	10,706
$150,000 ≤ price < $200,000	0.9925	0.9784	10.9638	5,887	0.9914	0.9782	10.6723	5,867
$200,000 ≤ price < $300,000	0.9685	0.9582	11.5357	4,553	0.9674	0.9581	11.3022	4,542
$300,000 ≤ price < $500,000	0.9553	0.9454	12.9516	2,111	0.9533	0.9454	12.4762	2,100
$500,000 ≤ price < $1 million	0.9297	0.9347	14.5895	508	0.9371	0.9358	13.5891	501
$1 million ≤ price	0.8752	0.8597	25.3589	43	0.8684	0.8597	22.0426	41

Note: See *Appendix Table A2* for 2005-2012 data.

Source: Author calculations from IAR data warehouse.

properties selling for $200,000 or more have an assessed value that is 3.0 percent to 13 percent lower than the sale price. This discrepancy between assessed value and sale price has implications for property taxes. Lower valued properties pay more property tax and higher value properties pay less property tax than they would if assessed value were closer to sales price.

Since 2008, properties with sales prices between $100,000 and $200,000 tend to have the most uniform assessments over time, i.e. the sales price ratio is closest to 1.0 and the coefficient of dispersion is lowest. See *Appendix Table A3* for detailed statistics. This is not surprising because these homes comprise a large share (39.2 percent) of the observed sales during this time period. Moreover, homes in these price ranges are likely to share more characteristics for comparison by assessors.

Sales Ratios in Urban and Rural Counties

Turning our evaluation to county-level analysis, we observe substantial variation in sales ratios and coefficients of determination among counties (*Appendix Table A4*). For example, in the 2012 trimmed sample, the mean sales ratio ranges from 0.94 to 1.15, the median sales ratio ranges from 0.88 to 1.19, and the coefficient of dispersion ranges from 10.3 to 29.4.

We provide more detailed analysis for the six counties and an aggregation of rural counties in *Table 3*. The sales ratios are calculated using 2012 data for Allen, Hamilton, and Marion counties (*Table 3a*). For Delaware, Howard, and Vigo counties and the rural aggregation of 45 of the 46 rural counties, we use 2010-2012 data in order to have a sufficient number of observations in each sales category (*Table 3b*).[7] These counties show the same pattern as the overall sample with low value properties tending to be over-assessed and high value properties being under-assessed, although, in some counties, (e.g. Allen County), the pattern is not as pronounced. In Hamilton and Marion counties, properties selling for less than $100,000 tend to fall outside the acceptable range of 0.9 to 1.1 for the median sales ratio. The sale ratios of higher valued properties tend to fall within the acceptable range.

7. We use the U.S. Bureau of the Census classification of rural counties.

Table 3a. Sales Ratios for Selected Counties, 2012

ALLEN COUNTY, INDIANA, 2012

Price Range	Sales Ratio, Untrimmed Sample				Sales Ratio, Trimmed Sample			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Allen County (incl Fort Wayne)	*1.159*	*1.025*	*23.564*	*2,653*	*1.051*	*1.014*	*13.626*	*2,445*
$10,000 ≤ price < $30,000	2.119	1.990	40.940	202	1.204	1.168	25.575	86
$30,000 ≤ price < $50,000	1.508	1.587	28.325	202	1.267	1.348	25.480	138
$50,000 ≤ price < $70,000	1.215	1.122	26.686	231	1.153	1.107	21.234	209
$70,000 ≤ price < $100,000	1.064	1.040	13.526	572	1.057	1.039	12.947	567
$100,000 ≤ price < $150,000	1.012	0.999	8.509	734	1.012	0.999	8.509	734
$150,000 ≤ price < $200,000	0.997	0.991	7.622	328	0.997	0.991	7.622	328
$200,000 ≤ price < $300,000	0.997	0.989	9.446	248	0.993	0.988	9.109	247
$300,000 ≤ price < $500,000	1.006	1.000	9.942	105	1.006	1.000	9.942	105
$500,000 ≤ price	0.999	0.997	8.467	31	0.999	0.997	8.467	31

HAMILTON COUNTY, INDIANA, 2012

Price Range	Sales Ratio, Untrimmed Sample				Sales Ratio, Trimmed Sample			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Hamilton County (incl Carmel, Fishers, Noblesville)	*1.018*	*0.966*	*12.726*	*3,591*	*0.994*	*0.965*	*10.304*	*3,540*
$10,000 ≤ price < $30,000	3.800	3.008	52.574	14	..	..		-
$30,000 ≤ price < $50,000	2.150	2.133	26.628	25	1.409	1.466	17.497	9
$50,000 ≤ price < $70,000	1.495	1.495	21.249	42	1.334	1.344	17.169	32
$70,000 ≤ price < $100,000	1.220	1.179	18.242	207	1.196	1.173	16.682	202
$100,000 ≤ price < $150,000	1.025	0.992	9.507	862	1.024	0.991	9.409	861
$150,000 ≤ price < $200,000	0.974	0.957	7.758	829	0.972	0.957	7.573	828
$200,000 ≤ price < $300,000	0.957	0.941	8.590	909	0.957	0.941	8.590	909
$300,000 ≤ price < $500,000	0.956	0.933	9.873	517	0.951	0.933	9.325	516
$500,000 ≤ price	0.958	0.936	10.964	186	0.952	0.936	9.675	183

MARION COUNTY, INDIANA, 2012

Price Range	Sales Ratio, Untrimmed Sample				Sales Ratio, Trimmed Sample			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Marion County (incl Indianapolis)	*1.505*	*1.172*	*45.538*	*10,448*	*1.131*	*1.076*	*18.517*	*8,032*
$10,000 ≤ price < $30,000	3.003	2.800	30.645	1,275	1.412	1.524	15.949	146
$30,000 ≤ price < $50,000	2.074	2.005	23.634	984	1.432	1.488	15.835	317
$50,000 ≤ price < $70,000	1.578	1.551	21.103	1,037	1.390	1.435	15.169	771
$70,000 ≤ price < $100,000	1.246	1.181	19.763	1,608	1.198	1.160	16.512	1,513
$100,000 ≤ price < $150,000	1.066	1.039	13.542	2,372	1.063	1.039	12.694	2,346
$150,000 ≤ price < $200,000	1.030	1.000	14.224	981	1.023	1.000	13.202	969
$200,000 ≤ price < $300,000	1.016	0.991	14.567	747	1.010	0.991	13.828	742
$300,000 ≤ price < $500,000	0.967	0.940	18.099	341	0.963	0.940	17.056	336
$500,000 ≤ price	0.890	0.917	19.996	119	0.897	0.923	19.216	118

Source: Author calculations from IAR data warehouse.

Table 3b. Sales Ratios for Selected Counties and Rural Aggregate, 2010-2012

DELAWARE COUNTY, INDIANA, 2010-2012								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Delaware County (incl Muncie)	*1.453*	*1.097*	*48.312*	*984*	*1.070*	*1.019*	*17.650*	*774*
$10,000 ≤ price < $30,000	2.835	2.683	32.192	176	1.384	1.418	16.193	28
$30,000 ≤ price < $50,000	1.733	1.656	30.371	111	1.308	1.315	19.821	66
$50,000 ≤ price < $70,000	1.207	1.150	24.812	132	1.119	1.117	19.257	122
$70,000 ≤ price < $100,000	1.084	1.018	19.409	192	1.058	1.017	17.199	188
$100,000 ≤ price < $150,000	1.006	0.996	13.065	195	0.998	0.995	12.377	194
$150,000 ≤ price < $200,000	0.969	0.976	10.814	92	0.984	0.979	9.464	90
Sales Price ≥ $300,000	0.973	0.984	13.191	28	0.973	0.984	13.191	28

HOWARD COUNTY, INDIANA, 2010-2012								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Howard County (incl Kokomo)	*1.633*	*1.172*	*57.154*	*2,022*	*1.098*	*1.035*	*18.083*	*1,453*
$10,000 ≤ price < $30,000	3.097	2.845	29.618	465	1.509	1.592	12.748	41
$30,000 ≤ price < $50,000	1.749	1.668	28.365	278	1.333	1.326	16.937	159
$50,000 ≤ price < $70,000	1.253	1.188	20.796	289	1.193	1.164	17.199	269
$70,000 ≤ price < $100,000	1.094	1.042	15.528	414	1.081	1.040	14.440	409
$100,000 ≤ price < $150,000	0.991	0.963	12.195	349	0.989	0.962	11.965	348
$150,000 ≤ price < $200,000	0.956	0.946	11.307	130	0.956	0.946	11.307	130
$200,000 ≤ price	0.931	0.921	11.432	97	0.931	0.921	11.432	97

VIGO COUNTY, INDIANA, 2010-2012								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Vigo County (incl Terre Haute)	*1.434*	*1.088*	*48.377*	*1,815*	*1.074*	*1.020*	*19.598*	*1,467*
$10,000 ≤ price < $30,000	2.836	2.561	39.387	309	1.400	1.460	14.997	69
$30,000 ≤ price < $50,000	1.615	1.484	31.875	269	1.280	1.275	19.100	184
$50,000 ≤ price < $70,000	1.167	1.060	26.490	253	1.100	1.037	21.608	238
$70,000 ≤ price < $100,000	1.063	1.024	18.939	314	1.050	1.016	18.077	310
$100,000 ≤ price < $150,000	1.013	0.980	15.850	333	1.003	0.978	14.935	330
$150,000 ≤ price < $200,000	0.979	0.956	12.925	165	0.974	0.956	12.439	164
$200,000 ≤ price < $300,000	0.970	0.950	13.471	123	0.970	0.950	13.471	123
$300,000 ≤ price	0.925	0.911	13.997	49	0.925	0.911	13.997	49

RURAL AGGREGATE, 2010-2012								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Rural aggregate, 45 of 46 counties	*1.415*	*1.080*	*48.651*	*15,344*	*1.054*	*1.010*	*19.524*	*12,276*
$10,000 ≤ price < $30,000	2.881	2.652	35.003	2,453	1.422	1.457	15.143	424
$30,000 ≤ price < $50,000	1.658	1.542	32.907	1,984	1.264	1.271	19.584	1,270
$50,000 ≤ price < $70,000	1.190	1.100	27.355	2,263	1.100	1.068	21.189	2,058
$70,000 ≤ price < $100,000	1.062	1.015	20.033	3,209	1.038	1.011	17.755	3,127
$100,000 ≤ price < $150,000	0.981	0.972	14.996	2,945	0.978	0.971	14.459	2,927
$150,000 ≤ price < $200,000	0.958	0.963	14.082	1,376	0.959	0.963	13.709	1,369
$200,000 ≤ price < $300,000	0.940	0.934	15.520	798	0.938	0.934	14.425	790
$300,000 ≤ price < $500,000	0.963	0.958	17.500	244	0.962	0.958	17.018	242
$500,000 ≤ price	0.913	0.893	25.582	72	0.946	0.894	23.055	69

Source: Author calculations from IAR data warehouse.

Sales Ratios in Township Assessing Units

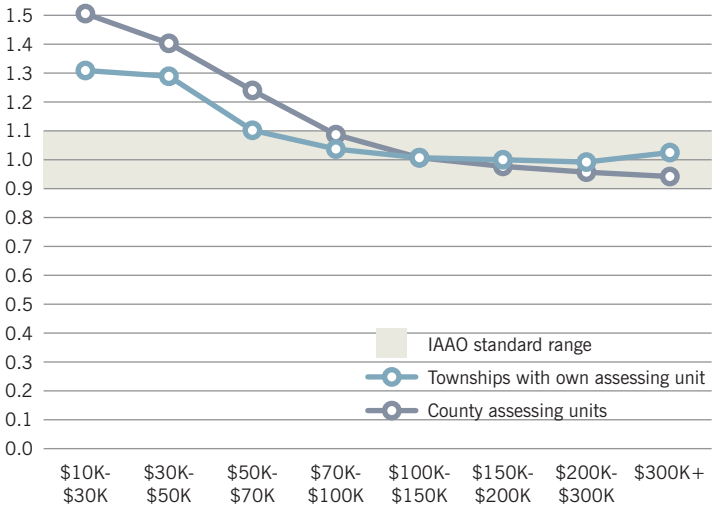
Figure 4 and *Appendix Table A5* show sales ratios for Indiana's 13 township and 92 county assessing units in 2012. The mean and median sales ratios are higher in county assessing units for properties with sales prices between $10,000 and $100,000. The coefficient of dispersion is higher in township assessing units for properties selling between $30,000 and $70,000, indicating greater variation around the median sales ratio for properties in these categories. The sales ratios and CODs are similar for properties in the $100,000 to $200,000 sales categories. For properties priced at $200,000 and above, county assessing units have lower sales ratios than the township assessing units. The smaller spread in sales ratios within township assessing units is likely related to the smaller geographic area and number of properties assessed in townships compared to a county.

Sales Ratios for Homesteads and Non-Homesteads

Next, we examine differences in sales ratios for owner-occupied properties and non-owner occupied properties. In Indiana, owner-occupied properties qualify for a homestead deduction equal to $45,000 or 60 percent of assessed value. *Figure 5* and *Appendix Table A6* show sales ratios for homestead and non-homestead properties in 2012. Non-homestead properties are likely to be rental properties or second homes. Both types of properties show that same pattern described earlier of lower value properties being over-assessed and higher value properties being under-assessed. The sales ratios for non-homestead properties tend to be higher than those of homestead properties, which are likely due to rental properties being more difficult to assess. The CODs for non-homestead properties selling for more than $70,000 are large, indicating more variation in sales rations within these price ranges.

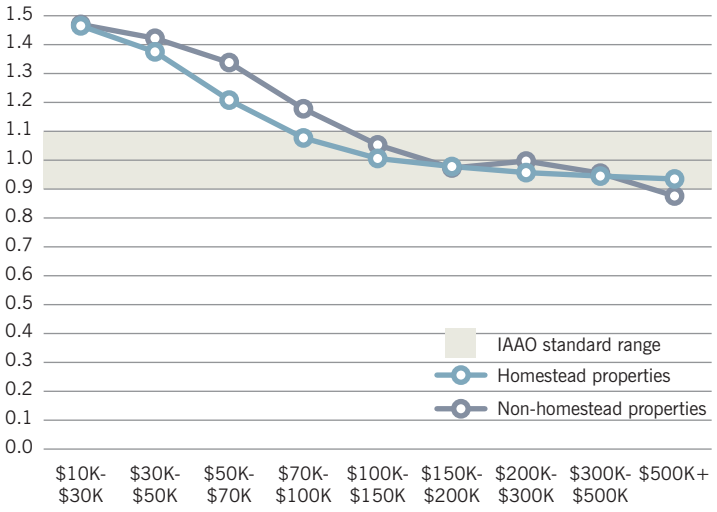
Example 1 provides more detail on the variation in sales ratios . A sample of residential properties that were listed for sale in Fort Wayne (Allen County) from October 2011 through June 2012 is shown. The properties are in the same township (St. Joseph Township) and school system (Fort Wayne Community Schools) and were built

Figure 4. Sales Ratios for Townships with Own Assessment Compared with County Assessors, 2012



Source: Author calculations from IAR data warehouse.

Figure 5. Sales Ratios for Homestead and Non-Homestead Properties, 2012



Source: Author calculations from IAR data warehouse.

Example 1. Properties with Three Bedrooms in Fort Wayne, Indiana (St. Joseph Township, Fort Wayne Community Schools)

Listing Date	Sold Price	Total Sq Ft (Structure)	Land Sq Ft	Bathrooms	Year Built	Net Tax Due	Net Assessed Value	Gross Tax Levy	Gross Assessed Value	Sales Ratio	Effective Tax Rate (Net)	Effective Tax Rate (Gross)
3/8/12	$29,000	1,430	9,500	2	1991	361	20,865	392	77,100	2.659	1.7%	0.5%
3/16/12	$30,000	1,872	10,000	2	1995	994	52,900	994	52,900	1.763	1.9%	1.9%
6/15/12	$62,011	1,752	10,125	2	1992	814	27,680	885	92,200	1.487	2.9%	1.0%
3/13/12	$93,000	1,784	9,750	2	1997	1,269	50,960	1,628	123,400	1.327	2.5%	1.3%
3/28/12	$94,000	1,421	11,875	2	1994	1,118	38,730	1,238	109,200	1.162	2.9%	1.1%
10/31/11	$95,000	1,418	7,980	2	1996	1,183	42,760	1,366	115,400	1.215	2.8%	1.2%
4/30/12	$97,500	1,332	10,019	2	1991	852	28,980	926	94,200	0.966	2.9%	1.0%
2/21/12	$111,000	1,634	8,127	2	1997	1,235	46,010	1,470	120,400	1.085	2.7%	1.2%
4/25/12	$130,000	1,763	10,000	2	1992	1,358	56,550	1,807	132,000	1.015	2.4%	1.4%
10/29/11	$140,000	1,500	42,253	2	1995	1,097	63,430	1,192	147,200	1.051	1.7%	0.8%
12/5/11	$161,000	2,605	11,004	4	1992	1,515	63,430	2,027	147,200	0.914	2.4%	1.4%
5/16/12	$163,000	1,985	9,906	3	1994	1,560	66,225	2,116	151,500	0.929	2.4%	1.4%
4/11/11	$285,500	2,177	14,570	3	1999	2,866	147,540	4,715	276,600	0.969	1.9%	1.7%
3/1/12	$315,000	2,250	16,275	3	1998	3,315	175,490	5,608	319,600	1.015	1.9%	1.8%

Source: Author calculations from IAR data warehouse.

between 1991 and 1999. Sales prices on these properties range from $29,000 to $315,000, and the sales ratio varies from 0.914 to 2.659.

Conclusion and Recommendations

Since 2000, there have been dramatic changes in Indiana's property tax system—still the primary source of funding for local governments in the state. These changes include a court-ordered reassessment, the implementation of trending to bring assessed value close to market value, and the enactment of property tax caps. Efforts to improve assessment practices included a reduction in the number of assessing units and the implementation of computer software for mass appraisals in some areas.

The sales ratio analysis presented here suggests that there remains substantial variation in the uniformity of assessment among sales price categories. We have examined sales ratios for residential properties in various geographic units. These properties represent less than half of the assessed value and property tax levy in the state with commercial and agricultural property making the balance. Regardless of the unit of analysis—county, rural aggregate, homestead only, township or county assessing unit—we find that low value properties tend to be over-assessed and high value properties tend to be under-assessed. Additional work is needed to better understand the cause of these discrepancies and to recommend ways to address errors in assessment.

Without further analysis we cannot know the cause of the errors in assessment, only that they exist. Future research will use additional hedonic modeling techniques to provide more detailed analysis on the accuracy of assessment given property characteristics. This approach will estimate property value based on the characteristics of the property and neighborhood (including socioeconomic characteristics) and compare the estimated property value with the sales price and assessed value. This will provide a far clearer analysis of the cause and provide potential remedies to the errors in assessment we observe in Indiana's residential properties.

The differences in sales ratios among sales categories are likely to generate significant differences in the effective tax rate paid by property owners. We plan to investigate differences in effective tax rates in future analysis. Finally, commercial, industrial, utility, and non-homestead agricultural properties were not considered here. Additional data and analysis are needed to examine assessment quality for these types of properties.

Credits

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Note

Additional data can be found in the ***Appendix*** (pages 11-16).

Table A1. Descriptive Statistics for Under- and Over-Assessed Properties, 2005-2012

Table A2. Sales Ratios by Year and Price Range, 2005-2012 Totals

Table A3. Sales Ratios by Price Category, 2005-2012 Yearly

Table A4. Sales Ratios by County, Untrimmed and Trimmed Samples, 2012

Table A5. Sales Ratios for Townships with Own Assessment Compared with County Assessors, 2012

Table A6. Sales Ratios for Homestead and Non-Homestead Properties, 2012

Table A1. Descriptive Statistics for Under- and Over-Assessed Properties, 2005-2012

UNTRIMMED SAMPLE										
Year	*Under Assessed*					*Over Assessed*				
	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations
All years	*19.28*	*22.69*	*3.41*	*283.44*	*137,977*	*21.06*	*16.75*	*-4.31*	*311.79*	*163,091*
2005	3.08	3.96	0.88	65.05	25,391	0.90	0.74	-0.16	21.92	9,747
2006	2.08	2.45	0.37	43.49	16,792	1.86	1.54	-0.32	43.78	16,253
2007	2.60	3.09	0.49	50.12	18,510	1.87	1.57	-0.30	38.95	14,605
2008	2.16	2.50	0.34	22.63	14,888	2.52	2.04	-0.48	31.99	18,911
2009	2.19	2.52	0.33	22.46	15,764	3.69	2.84	-0.85	44.49	27,363
2010	2.41	2.77	0.36	26.41	16,359	3.38	2.63	-0.75	42.87	24,842
2011	2.16	2.46	0.30	23.67	13,923	3.50	2.74	-0.76	43.86	25,921
2012	2.59	2.94	0.35	29.60	16,350	3.35	2.65	-0.70	43.93	25,449

TRIMMED SAMPLE										
Year	*Under Assessed*					*Over Assessed*				
	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations	Gross AV Sum ($B)	Sales Price Sum ($B)	Difference	Gross Tax Levy ($M)	Observations
All years	*19.19*	*22.23*	*3.04*	*281.62*	*135,956*	*18.17*	*15.62*	*-2.55*	*258.37*	*126,699*
2005	3.06	3.82	0.76	64.45	24,819	0.81	0.70	-0.11	19.44	8,117
2006	2.07	2.38	0.31	43.20	16,478	1.69	1.47	-0.22	38.98	13,692
2007	2.58	2.98	0.40	49.64	18,032	1.71	1.51	-0.20	35.06	12,447
2008	2.15	2.44	0.29	22.45	14,634	2.22	1.92	-0.30	25.88	15,051
2009	2.19	2.48	0.29	22.30	15,553	3.08	2.61	-0.47	34.75	20,218
2010	2.41	2.75	0.34	26.37	16,283	2.84	2.42	-0.42	33.89	18,481
2011	2.16	2.45	0.29	23.64	13,867	2.96	2.52	-0.44	34.92	19,402
2012	2.58	2.93	0.35	29.56	16,290	2.85	2.45	-0.40	35.43	19,291

Source: Author calculations from IAR data warehouse.

Table A2. Sales Ratios by Year and by Price Range, 2005-2012 Totals

RATIOS BY YEAR										
Year	*Sales Ratio, Untrimmed Sample*					*Sales Ratio, Trimmed Sample*				
	Mean	Median	COD	PRD	Observations	Mean	Median	COD	PRD	Observations
2005-2012	*1.246*	*1.020*	*36.377*	*1.218*	*301,865*	*1.033*	*0.994*	*16.845*	*1.046*	*263,452*
2005	0.976	0.883	27.307	1.151	35,180	0.912	0.876	18.538	1.065	32,978
2006	1.131	0.997	28.028	1.148	33,139	1.019	0.985	16.686	1.045	30,264
2007	1.096	0.980	26.886	1.144	33,225	0.997	0.971	15.575	1.043	30,589
2008	1.248	1.025	35.421	1.210	33,878	1.045	1.003	16.435	1.043	29,764
2009	1.388	1.074	43.919	1.266	43,206	1.075	1.027	17.133	1.039	35,850
2010	1.342	1.053	41.661	1.252	41,283	1.057	1.012	17.226	1.043	34,846
2011	1.373	1.079	41.144	1.259	39,956	1.081	1.033	16.970	1.049	33,381
2012	1.319	1.051	38.377	1.242	41,998	1.065	1.014	16.531	1.054	35,780

RATIOS BY PRICE RANGE (2005-2012 TOTAL)								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.849	2.649	35.809	27,506	1.377	1.439	17.361	5,368
$30,000 ≤ price < $50,000	1.735	1.654	31.138	23,287	1.297	1.326	19.928	13,634
$50,000 ≤ price < $70,000	1.248	1.169	29.531	28,216	1.142	1.113	23.476	24,992
$70,000 ≤ price < $100,000	1.073	1.030	20.481	55,076	1.055	1.026	18.775	53,837
$100,000 ≤ price < $150,000	0.994	0.981	13.712	80,062	0.995	0.981	12.957	79,320
$150,000 ≤ price < $200,000	0.968	0.967	12.712	40,589	0.973	0.969	11.655	40,087
$200,000 ≤ price < $300,000	0.946	0.951	13.524	29,562	0.954	0.953	12.359	29,115
$300,000 ≤ price < $500,000	0.926	0.938	15.375	13,652	0.938	0.941	13.682	13,343
$500,000 ≤ price < $1 million	0.900	0.917	18.226	3,599	0.916	0.922	15.432	3,466
$1 million ≤ price	0.823	0.844	26.120	316	0.855	0.852	20.677	290

Source: Author calculations from IAR data warehouse.

Table A3a. Sales Ratios by Price Category, 2005-2008 Yearly

2005 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.1495	1.9760	32.3009	2,271	1.4169	1.4671	14.6242	912
$30,000 ≤ price < $50,000	1.2925	1.2605	24.8685	2,363	1.2039	1.2111	20.8400	2,127
$50,000 ≤ price < $70,000	0.9606	0.9199	24.8715	3,240	0.9554	0.9192	23.8827	3,199
$70,000 ≤ price < $100,000	0.9013	0.8835	18.9196	7,350	0.9037	0.8843	18.4329	7,294
$100,000 ≤ price < $150,000	0.8702	0.8732	13.1024	10,360	0.8788	0.8753	12.2034	10,227
$150,000 ≤ price < $200,000	0.8252	0.8471	14.2946	4,469	0.8466	0.8515	12.0124	4,325
$200,000 ≤ price < $300,000	0.7911	0.8162	15.4780	2,990	0.8133	0.8218	13.1106	2,887
$300,000 ≤ price < $500,000	0.7532	0.7817	17.2493	1,589	0.7869	0.7892	13.5821	1,501
$500,000 ≤ price < $1 million	0.7175	0.7528	20.6041	502	0.7598	0.7643	15.9248	466
$1 million ≤ price	0.6483	0.6781	28.6285	46	0.7162	0.7099	20.8475	40

2006 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.3273	2.1930	32.9928	2,566	1.3749	1.4460	17.9228	808
$30,000 ≤ price < $50,000	1.4907	1.4515	25.5117	2,587	1.2964	1.3375	19.1360	1,994
$50,000 ≤ price < $70,000	1.1201	1.0567	26.2981	3,605	1.0785	1.0420	22.8015	3,411
$70,000 ≤ price < $100,000	1.0124	0.9947	17.1577	7,377	1.0111	0.9947	16.6950	7,330
$100,000 ≤ price < $150,000	0.9700	0.9701	11.9436	9,392	0.9743	0.9708	11.1627	9,300
$150,000 ≤ price < $200,000	0.9397	0.9578	11.5581	3,801	0.9521	0.9600	10.3357	3,738
$200,000 ≤ price < $300,000	0.9187	0.9445	13.2313	2,402	0.9393	0.9496	11.2671	2,338
$300,000 ≤ price < $500,000	0.8940	0.9280	15.6586	1,097	0.9263	0.9361	12.5571	1,052
$500,000 ≤ price < $1 million	0.8519	0.9094	17.0462	278	0.8982	0.9163	12.4900	262
$1 million ≤ price	0.8172	0.8683	22.4124	34	0.8862	0.8777	15.8392	31

2007 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.4437	2.2004	37.9817	2,132	1.3596	1.3955	17.7772	655
$30,000 ≤ price < $50,000	1.4829	1.4250	28.9501	2,107	1.2554	1.2696	21.3815	1,608
$50,000 ≤ price < $70,000	1.0910	1.0369	26.4135	3,021	1.0592	1.0222	23.1159	2,862
$70,000 ≤ price < $100,000	1.0014	0.9825	17.6460	6,004	0.9994	0.9823	16.8380	5,936
$100,000 ≤ price < $150,000	0.9651	0.9649	12.5306	8,992	0.9704	0.9665	11.4717	8,881
$150,000 ≤ price < $200,000	0.9490	0.9554	12.5557	5,056	0.9551	0.9579	10.1215	4,950
$200,000 ≤ price < $300,000	0.9134	0.9389	13.0300	3,715	0.9381	0.9423	10.6383	3,595
$300,000 ≤ price < $500,000	0.8830	0.9160	15.2127	1,698	0.9089	0.9225	12.1664	1,630
$500,000 ≤ price < $1 million	0.8400	0.8879	17.0686	459	0.8766	0.8949	13.4897	434
$1 million ≤ price	0.7523	0.7729	27.0445	41	0.7949	0.7804	23.1890	38

2008 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.9040	2.7035	36.5030	2,919	1.3680	1.4410	17.5398	558
$30,000 ≤ price < $50,000	1.7317	1.6689	29.5838	2,561	1.3159	1.3429	19.8419	1,512
$50,000 ≤ price < $70,000	1.2480	1.1655	28.3205	2,970	1.1531	1.1190	22.8846	2,662
$70,000 ≤ price < $100,000	1.0819	1.0406	19.9039	5,934	1.0684	1.0365	18.4451	5,814
$100,000 ≤ price < $150,000	1.0118	0.9916	13.2958	8,885	1.0129	0.9920	12.5232	8,797
$150,000 ≤ price < $200,000	0.9817	0.9812	11.5608	4,836	0.9896	0.9827	10.5215	4,770
$200,000 ≤ price < $300,000	0.9632	0.9667	12.5656	3,731	0.9720	0.9678	11.3759	3,672
$300,000 ≤ price < $500,000	0.9348	0.9526	13.7087	1,613	0.9537	0.9562	11.6093	1,567
$500,000 ≤ price < $1 million	0.9133	0.9495	15.4721	397	0.9427	0.9552	12.7488	382
$1 million ≤ price	0.8085	0.8194	18.6152	32	0.8848	0.8554	14.1640	30

Source: Author calculations from IAR data warehouse.

Table A3b. Sales Ratios by Price Category, 2009-2012 Yearly

2009 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	3.1788	2.9863	33.8565	4,825	1.3479	1.3875	18.5703	615
$30,000 ≤ price < $50,000	1.9427	1.8960	29.9639	3,512	1.3233	1.3612	19.7302	1,567
$50,000 ≤ price < $70,000	1.3718	1.3185	28.1641	4,014	1.2202	1.2150	21.7205	3,336
$70,000 ≤ price < $100,000	1.1404	1.0907	20.3699	7,697	1.1152	1.0840	18.3032	7,466
$100,000 ≤ price < $150,000	1.0315	1.0048	13.9967	11,436	1.0299	1.0048	13.0554	11,304
$150,000 ≤ price < $200,000	1.0096	0.9945	12.5467	5,661	1.0099	0.9947	11.8461	5,610
$200,000 ≤ price < $300,000	0.9926	0.9828	13.0864	3,959	0.9943	0.9833	11.8740	3,901
$300,000 ≤ price < $500,000	0.9872	0.9832	15.5139	1,664	0.9924	0.9843	13.9699	1,630
$500,000 ≤ price < $1 million	0.9995	0.9980	18.3033	404	1.0002	0.9999	15.4623	389
$1 million ≤ price	0.9091	0.8688	26.2833	34	0.9511	0.8723	23.2625	32

2010 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	3.0716	2.8852	33.5101	4,339	1.3619	1.4440	18.2959	591
$30,000 ≤ price < $50,000	1.8609	1.8146	29.4982	3,357	1.3203	1.3563	19.5712	1,636
$50,000 ≤ price < $70,000	1.3403	1.2648	28.8299	3,787	1.1936	1.1800	21.9189	3,192
$70,000 ≤ price < $100,000	1.1267	1.0734	20.9353	7,028	1.0985	1.0634	18.7388	6,802
$100,000 ≤ price < $150,000	1.0205	0.9991	13.6888	10,486	1.0174	0.9990	13.1095	10,418
$150,000 ≤ price < $200,000	0.9974	0.9847	12.2875	5,559	0.9938	0.9843	11.7451	5,527
$200,000 ≤ price < $300,000	0.9778	0.9666	12.8668	4,194	0.9749	0.9664	12.4108	4,177
$300,000 ≤ price < $500,000	0.9767	0.9684	13.7873	1,986	0.9735	0.9681	13.3907	1,976
$500,000 ≤ price < $1 million	0.9846	0.9660	18.2679	509	0.9615	0.9619	15.3416	493
$1 million ≤ price	0.9122	0.8997	29.9622	38	0.8900	0.8997	22.1270	34

2011 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	3.0215	2.8129	33.7947	4,342	1.3546	1.4269	18.9566	594
$30,000 ≤ price < $50,000	1.9078	1.8518	28.9855	3,348	1.3371	1.3786	18.3185	1,543
$50,000 ≤ price < $70,000	1.3869	1.3243	27.6383	3,826	1.2322	1.2213	21.0325	3,178
$70,000 ≤ price < $100,000	1.1685	1.1128	20.5394	6,870	1.1338	1.1012	17.8770	6,606
$100,000 ≤ price < $150,000	1.0487	1.0211	13.4917	9,748	1.0443	1.0207	12.9749	9,687
$150,000 ≤ price < $200,000	1.0126	0.9969	11.5699	5,320	1.0106	0.9966	11.2475	5,300
$200,000 ≤ price < $300,000	0.9893	0.9804	12.3442	4,018	0.9880	0.9804	12.0357	4,003
$300,000 ≤ price < $500,000	0.9792	0.9728	12.7084	1,894	0.9766	0.9726	12.3437	1,887
$500,000 ≤ price < $1 million	0.9557	0.9391	14.4423	542	0.9530	0.9388	14.0000	539
$1 million ≤ price	0.8849	0.8770	23.7410	48	0.9043	0.8777	18.1036	44

2012 SALES PRICE								
Price Range	*Sales Ratio, Untrimmed Sample*				*Sales Ratio, Trimmed Sample*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
$10,000 ≤ price < $30,000	2.9287	2.7392	32.9555	4,112	1.4090	1.4654	16.4854	635
$30,000 ≤ price < $50,000	1.8743	1.8295	27.4597	3,452	1.3544	1.3935	18.2207	1,647
$50,000 ≤ price < $70,000	1.3810	1.3207	26.5572	3,753	1.2403	1.2271	20.6028	3,152
$70,000 ≤ price < $100,000	1.1477	1.0913	19.4422	6,816	1.1192	1.0828	17.2458	6,589
$100,000 ≤ price < $150,000	1.0292	1.0075	12.5020	10,763	1.0265	1.0072	12.0551	10,706
$150,000 ≤ price < $200,000	0.9925	0.9784	10.9638	5,887	0.9914	0.9782	10.6723	5,867
$200,000 ≤ price < $300,000	0.9685	0.9582	11.5357	4,553	0.9674	0.9581	11.3022	4,542
$300,000 ≤ price < $500,000	0.9553	0.9454	12.9516	2,111	0.9533	0.9454	12.4762	2,100
$500,000 ≤ price < $1 million	0.9297	0.9347	14.5895	508	0.9371	0.9358	13.5891	501
$1 million ≤ price	0.8752	0.8597	25.3589	43	0.8684	0.8597	22.0426	41

Source: Author calculations from IAR data warehouse.

Table A4a. Sales Ratios by County, Untrimmed Sample, 2012

County	Sales Ratio, Untrimmed Sample				
	Mean	Median	Coefficient of Dispersion	Price Ratio Differential	Observations
Total 2012	*1.319*	*1.051*	*38.377*	*1.242*	*41,998*
Adams	1.407	1.180	36.339	1.197	92
Allen	1.159	1.025	23.564	1.110	2,653
Bartholomew	1.050	0.975	18.527	1.077	641
Benton	1.672	1.325	50.195	1.305	56
Boone	1.170	1.029	24.896	1.152	560
Brown	1.244	1.051	30.739	1.139	72
Carroll	1.427	0.994	60.729	1.425	78
Cass	1.579	1.165	57.692	1.388	214
Clark	1.218	1.046	25.331	1.126	574
Clay	1.189	0.984	34.737	1.232	38
Clinton	1.441	1.014	57.258	1.334	163
Daviess	1.155	0.977	36.708	1.218	143
Dearborn	1.308	1.017	41.484	1.257	306
Decatur	1.205	0.989	34.840	1.189	80
DeKalb	1.254	1.041	31.696	1.185	152
Delaware	1.437	1.098	45.904	1.301	377
Dubois	1.114	0.969	27.230	1.146	207
Elkhart	1.383	1.120	38.233	1.229	1,181
Fayette	1.400	1.157	38.647	1.195	86
Floyd	1.287	1.025	39.188	1.261	581
Fulton	1.196	1.045	29.565	1.160	103
Gibson	1.204	0.956	39.445	1.218	163
Grant	1.577	1.152	52.986	1.358	342
Hamilton	1.018	0.966	12.726	1.041	3,591
Hancock	1.288	1.086	30.592	1.173	749
Harrison	1.314	1.032	37.761	1.252	36
Hendricks	1.154	1.042	19.836	1.087	1,509
Henry	1.716	1.367	51.748	1.359	138
Howard	1.615	1.158	58.358	1.402	611
Huntington	1.289	1.057	37.051	1.198	125
Jackson	1.271	1.000	41.563	1.232	181
Jasper	1.191	1.036	24.612	1.097	67
Jay	1.678	1.128	64.091	1.396	47
Jefferson	1.249	1.067	33.019	1.164	92
Jennings	1.281	0.983	39.786	1.230	62
Johnson	1.176	1.050	23.112	1.116	1,593
Knox	1.193	0.960	36.334	1.236	186
Kosciusko	1.166	1.004	30.662	1.150	610
Lagrange	1.582	1.172	55.565	1.357	85
Lake	1.505	1.103	48.751	1.327	1,436
Lawrence	1.360	1.041	47.099	1.277	181
Madison	1.653	1.213	58.132	1.410	1,062
Marion	1.505	1.172	45.538	1.312	9,464
Marshall	1.245	1.022	38.696	1.237	224
Miami	1.653	1.307	52.187	1.375	147
Monroe	1.037	1.002	12.915	1.042	915
Montgomery	1.376	1.057	46.305	1.282	223
Morgan	1.265	1.043	33.522	1.188	633
Noble	1.524	1.082	54.655	1.308	275
Owen	1.500	1.162	57.900	1.374	58
Perry	1.283	1.006	48.467	1.302	61
Porter	1.150	1.024	23.109	1.098	1,189
Posey	1.289	1.042	36.367	1.229	105
Putnam	1.317	1.081	38.815	1.204	128
Randolph	1.645	1.134	61.795	1.371	36
Ripley	1.277	1.061	35.706	1.226	72
Saint Joseph	1.410	1.071	47.925	1.350	1,874
Scott	1.418	1.133	44.588	1.226	56
Shelby	1.696	1.242	56.389	1.379	290
Spencer	1.233	0.973	37.369	1.211	57
Steuben	1.323	1.078	40.027	1.246	190
Sullivan	1.174	0.957	45.666	1.285	44
Tippecanoe	1.060	0.966	20.709	1.095	1,180
Tipton	1.664	1.180	57.513	1.409	60
Vanderburgh	1.298	1.027	38.364	1.239	1,717
Vigo	1.430	1.076	48.871	1.325	596
Wabash	1.549	1.096	60.425	1.404	147
Warrick	1.135	0.956	28.351	1.153	524
Wells	1.085	1.011	18.751	1.060	72
White	1.113	1.019	32.285	1.218	64
Whitley	1.330	1.086	36.115	1.461	40
Minimum	*1.018*	*0.956*	*12.726*	*1.041*	*36*
Maximum	*1.716*	*1.367*	*64.091*	*1.461*	*9,464*
Range	*0.698*	*0.412*	*51.365*	*0.420*	*9,428*

Note: Counties with fewer than 25 observations were omitted.

Source: Author calculations from IAR data warehouse.

Table A4b. Sales Ratios by County, Trimmed Sample, 2012

County	Sales Ratio, Trimmed Sample				
	Mean	Median	Coefficient of Dispersion	Price Ratio Differential	Observations
Total 2012	*1.065*	*1.014*	*16.531*	*1.054*	*35,780*
Adams	1.154	1.101	18.354	1.042	79
Allen	1.051	1.014	13.626	1.030	2,445
Bartholomew	1.002	0.966	14.086	1.039	617
Benton	1.154	1.190	18.495	1.040	36
Boone	1.051	1.015	14.008	1.051	516
Brown	1.066	1.030	15.607	1.015	64
Carroll	0.982	0.926	21.031	1.077	62
Cass	1.046	0.989	21.450	1.079	149
Clark	1.088	1.035	13.531	1.037	527
Clay	0.968	0.941	14.166	1.051	34
Clinton	0.984	0.939	17.661	1.035	121
Daviess	0.983	0.950	21.660	1.094	128
Dearborn	1.033	0.988	16.288	1.045	263
Decatur	0.995	0.970	15.953	1.045	68
DeKalb	1.068	1.016	15.324	1.046	137
Delaware	1.078	1.043	16.611	1.050	301
Dubois	1.004	0.955	16.881	1.059	195
Elkhart	1.107	1.059	16.833	1.050	980
Fayette	1.125	1.113	18.011	1.042	74
Floyd	1.029	0.992	15.930	1.060	491
Fulton	1.052	1.028	17.623	1.060	93
Gibson	0.989	0.932	17.985	1.041	144
Grant	1.106	1.042	17.795	1.069	251
Hamilton	0.994	0.965	10.304	1.023	3,540
Hancock	1.115	1.059	16.271	1.054	665
Harrison	1.051	1.020	13.757	1.047	32
Hendricks	1.085	1.033	13.783	1.040	1,432
Henry	1.122	1.104	21.528	1.087	89
Howard	1.079	1.005	18.957	1.068	435
Huntington	1.051	1.002	17.725	1.043	105
Jackson	0.999	0.957	17.084	1.039	156
Jasper	1.056	1.012	12.875	1.017	60
Jay	1.061	1.042	16.295	1.082	31
Jefferson	1.112	1.036	19.202	1.069	79
Jennings	1.013	0.954	14.689	1.040	51
Johnson	1.105	1.039	16.871	1.065	1,506
Knox	0.992	0.945	16.767	1.063	169
Kosciusko	1.022	0.981	17.818	1.038	553
Lagrange	1.088	1.065	21.279	1.093	62
Lake	1.087	1.039	14.244	1.036	1,130
Lawrence	1.057	0.974	22.126	1.074	150
Madison	1.093	1.031	20.680	1.078	748
Marion	1.131	1.076	18.517	1.072	7,258
Marshall	1.020	0.989	18.455	1.056	190
Miami	1.116	1.076	21.989	1.109	102
Monroe	1.011	1.000	10.418	1.021	896
Montgomery	1.022	0.993	16.930	1.051	177
Morgan	1.062	1.025	15.960	1.042	557
Noble	1.056	1.011	16.349	1.027	201
Owen	1.039	0.966	29.414	1.096	44
Perry	0.941	0.927	17.927	1.044	47
Porter	1.047	1.010	14.044	1.030	1,092
Posey	1.042	1.009	14.747	1.038	92
Putnam	1.067	1.033	18.762	1.042	111
Randolph	1.110	1.024	19.985	1.060	27
Ripley	1.053	1.016	17.618	1.069	61
Saint Joseph	1.051	1.008	18.590	1.076	1,513
Scott	1.118	1.026	23.396	1.055	45
Shelby	1.134	1.073	19.110	1.058	205
Spencer	1.005	0.964	15.672	1.036	49
Steuben	1.063	1.006	19.596	1.065	161
Sullivan	0.936	0.882	25.790	1.131	38
Tippecanoe	1.001	0.960	15.173	1.048	1,128
Tipton	1.141	1.089	18.704	1.081	46
Vanderburgh	1.039	1.002	14.961	1.038	1,484
Vigo	1.073	1.014	20.136	1.078	478
Wabash	1.046	0.999	19.800	1.078	107
Warrick	0.984	0.945	13.426	1.024	486
Wells	1.030	0.997	13.992	1.018	69
White	0.996	0.969	20.259	1.092	56
Whitley	1.097	1.026	17.057	1.274	35
Minimum	*0.936*	*0.882*	*10.304*	*1.015*	*27*
Maximum	*1.154*	*1.190*	*29.414*	*1.274*	*7,258*
Range	*0.218*	*0.307*	*19.110*	*0.259*	*7,231*

Note: Counties with fewer than 25 observations were omitted.

Source: Author calculations from IAR data warehouse.

Table A5. Sales Ratios for Townships with Own Assessment Compared with County Assessors, 2012

TOWNSHIPS WITH OWN ASSESSING UNIT, 2012								
Price Range	*Sales Ratio, Untrimmed Sample (PRD = 1.329)*				*Sales Ratio, Trimmed Sample (PRD = 1.043)*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Townships w/ own assessing unit	*1.542*	*1.128*	*53.129*	*2,767*	*1.089*	*1.038*	*17.926*	*2,077*
$10,000 ≤ price < $30,000	2.811	2.648	38.113	583	1.287	1.309	22.012	135
$30,000 ≤ price < $50,000	1.721	1.672	33.015	391	1.260	1.289	22.666	221
$50,000 ≤ price < $70,000	1.292	1.169	30.235	334	1.140	1.102	20.069	279
$70,000 ≤ price < $100,000	1.094	1.048	18.436	482	1.073	1.037	16.671	468
$100,000 ≤ price < $150,000	1.029	1.008	13.361	500	1.025	1.007	13.016	498
$150,000 ≤ price < $200,000	1.019	1.000	10.129	266	1.015	1.000	9.746	265
$200,000 ≤ price < $300,000	0.999	0.992	9.810	153	0.999	0.992	9.810	153
$300,000 ≤ price	0.997	1.025	13.602	58	0.997	1.025	13.602	58

COUNTY ASSESSING UNITS, 2012								
Price Range	*Sales Ratio, Untrimmed Sample (PRD = 1.232)*				*Sales Ratio, Trimmed Sample (PRD = 1.054)*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
County assessing units	*1.303*	*1.046*	*37.161*	*39,231*	*1.064*	*1.013*	*16.431*	*33,703*
$10,000 ≤ price < $30,000	2.948	2.750	32.164	3,529	1.442	1.506	14.627	500
$30,000 ≤ price < $50,000	1.894	1.842	26.815	3,061	1.369	1.403	17.551	1,426
$50,000 ≤ price < $70,000	1.390	1.342	25.932	3,419	1.250	1.240	20.463	2,873
$70,000 ≤ price < $100,000	1.152	1.095	19.481	6,334	1.123	1.087	17.249	6,121
$100,000 ≤ price < $150,000	1.029	1.008	12.460	10,263	1.027	1.007	12.008	10,208
$150,000 ≤ price < $200,000	0.991	0.977	10.998	5,621	0.990	0.977	10.710	5,602
$200,000 ≤ price < $300,000	0.967	0.957	11.582	4,400	0.966	0.957	11.341	4,389
$300,000 ≤ price	0.948	0.942	13.420	2,604	0.948	0.942	12.781	2,584

Source: Author calculations from IAR data warehouse.

Table A6. Sales Ratios for Homestead and Non-Homestead Properties, 2012

HOMESTEAD PROPERTIES, 2012								
Price Range	*Sales Ratio, Untrimmed Sample (PRD = 1.171)*				*Sales Ratio, Trimmed Sample (PRD = 1.046)*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Homestead properties	1.220	1.030	30.454	36,925	1.052	1.008	15.570	33,111
$10,000 ≤ price < $30,000	2.922	2.730	31.488	2,142	1.401	1.465	16.040	288
$30,000 ≤ price < $50,000	1.865	1.825	27.547	2,350	1.348	1.375	18.605	1,134
$50,000 ≤ price < $70,000	1.365	1.296	26.705	3,159	1.230	1.208	20.614	2,682
$70,000 ≤ price < $100,000	1.139	1.085	18.928	6,286	1.112	1.077	16.931	6,098
$100,000 ≤ price < $150,000	1.027	1.006	12.243	10,286	1.024	1.006	11.853	10,239
$150,000 ≤ price < $200,000	0.992	0.978	10.704	5,706	0.991	0.978	10.514	5,694
$200,000 ≤ price < $300,000	0.968	0.957	11.225	4,411	0.966	0.957	11.047	4,404
$300,000 ≤ price < $500,000	0.955	0.945	12.732	2,065	0.952	0.945	12.273	2,055
$500,000 ≤ price	0.936	0.935	14.310	520	0.934	0.935	13.899	517

NON-HOMESTEAD PROPERTIES, 2012								
Price Range	*Sales Ratio, Untrimmed Sample (PRD = 1.463)*				*Sales Ratio, Trimmed Sample (PRD = 1.106)*			
	Mean	Median	COD	Observations	Mean	Median	COD	Observations
Non-homestead properties	2.032	1.729	49.185	5,073	1.227	1.185	22.327	2,669
$10,000 ≤ price < $30,000	2.936	2.755	34.469	1,970	1.415	1.470	16.802	347
$30,000 ≤ price < $50,000	1.895	1.842	27.225	1,102	1.367	1.422	17.441	513
$50,000 ≤ price < $70,000	1.466	1.442	24.887	594	1.301	1.338	19.417	470
$70,000 ≤ price < $100,000	1.256	1.196	23.058	530	1.203	1.178	19.260	491
$100,000 ≤ price < $150,000	1.074	1.053	17.203	477	1.075	1.053	15.638	467
$150,000 ≤ price < $200,000	0.997	0.973	19.217	181	1.001	0.973	15.936	173
$200,000 ≤ price < $300,000	0.997	0.993	20.458	142	1.007	0.997	18.649	138
$300,000 ≤ price < $500,000	0.975	0.944	22.847	46	0.991	0.955	21.519	45
$500,000 ≤ price	0.743	0.777	37.177	31	0.888	0.876	21.276	25

Source: Author calculations from IAR data warehouse.