

2019 Cook County Sales Ratio Study



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The IAAO is a nonprofit, educational organization founded in 1934. Its mission is to promote innovation and excellence in property appraisal and property tax policy and administration through professional development, education, research, and professional consulting service assistance. Its nearly 9,000 members are government officials and others interested in property valuation and assessment administration. All IAAO members subscribe to IAAO's Code of Ethics and Standards of Professional Practice and to the Uniform Standards of Professional Appraisal Practice (USPAP).

The IAAO is the primary publisher, educator, and leader of standards in the field of property tax assessment. As a standard-setting organization, the IAAO has published 15 standards aimed at improving assessment practices. As an educator, the IAAO has established a curriculum of 30 courses and 28 workshops to supplement university-level and professional training for individuals interested in pursuing a career in property valuation and tax administration. We offer the only comprehensive program of mass appraisal courses in the world. In addition, we offer special seminars and an international conference on assessment administration annually.

IAAO offers 5 designations: a generalist designation requiring demonstrated competence in all areas of assessment—Certified Assessment Evaluator (CAE)—and 5 specialist designations: Mass Appraisal Specialist (MAS), Residential Evaluation Specialist (RES), Cadastral Mapping Specialist (CMS), Personal Property Specialist (PPS), and Assessment Administration Specialist (AAS).

For more than 20 years, IAAO has established voluntary, objective standards for the improvement of assessment practices and conducted a research and technical services program to help jurisdictions attain these standards. Professional consulting services are offered in a number of areas and by means of a variety of arrangements. Our most common engagement is to perform an evaluation of assessment practices within a specific jurisdiction. Our services are provided either on a time-and-materials or fixed-price basis, as the client may prefer, and are rendered by a team of experts chosen to meet the specific requirements of the assignment.

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Measuring Property Tax Assessment Equity

In order to measure the accuracy of their valuation estimates, an assessor's office will analyze recent market sales within an area and compare the actual sale price of each property against its estimated value (i.e. its fair market value¹).

By dividing the assessed value by the actual selling price—what is referred to in the assessment industry as the “assessment-to-sale-price ratio” or just “ratio”—the office can determine whether they over- or underestimated a property's market value.

For example, consider a property that is assessed at \$100,000. If the property sells for \$200,000, its ratio would be 0.5 (\$100,000 divided by \$200,000) and it would be under-assessed. If the property, however, only sells for \$50,000, its ratio would be 2.0 (\$100,000 divided by \$50,000) and it would be over-assessed. The detailed analysis that utilizes statistical measures to identify assessment inequities is referred to as a “ratio study.”

The *IAAO Standard on Ratio Studies* states that properties should be assessed at 100% of market value (a ratio equal to 1.0 or 100%) but may be assessed between 90% and 110% of market value (a ratio between .90 and 1.10). To illustrate, a property that has a market value of \$100,000 should be assessed at \$100,000, but assessed values between \$90,000 and \$110,000 are acceptable. The median ratio is the middle ratio of a listing of ratios based on their value. It is useful in ratio studies because it is not heavily influenced by outliers.

Assessment inequity exists when patterns of relative under- or over-assessing emerge. Assessors study these patterns of inequity to identify where assessment accuracy may be improved. Horizontal inequity refers to inconsistent ratios across classifications (e.g. property types, neighborhoods, construction time-periods) or across seemingly similar properties. Assessors utilize a statistic called the coefficient of dispersion (COD) to effectively measure how “spread out” assessed levels are. The COD is calculated around the median assessment ratio and is defined by the IAAO as the average percentage deviation of the ratios from the median ratio. This statistic helps assessors evaluate the consistency of their work, as lower CODs indicate more consistent, equitable valuations. Larger CODs indicate a higher variation and less equitable valuations. According to IAAO's *Standard on Ratio Studies*, COD values for a variety of property types in a large jurisdiction such as Cook County should fall between 5% and 15%, but an upper limit of 20% when comparing varying kinds of property is acceptable.

Vertical inequity refers to inconsistent ratios across properties of different values. The two types of vertical inequity assessors test for are regressivity—when higher-value properties enjoy relatively lower ratios—and progressivity—when lower-value properties receive the benefit. The price-related differential (PRD) is a statistical measure that tests assessments for evidence of vertical inequity. IAAO's *Standard on Ratio Studies* states that an acceptable PRD value lies between .98 and 1.03. PRD values above this range suggest assessment regressivity, while values below suggest assessment progressivity.

¹ In Cook County, the first step of assessments for all property classes is to determine the full estimated market value of the property. Estimated market values should generally be close to 100% of arms-length sale prices. To calculate Assessed Value, a fractional rate is applied. These rates, set by Cook County Ordinance, are 10% for residential property classes (including apartment buildings), 25% for commercial property classes, and varies for incentive property classes. For ease of analysis, in this study, the term “assessed value” refers to estimated market values (before they are transformed by assessment rates), which should generally be close to 100% of sale prices.

Analysis

This ratio study was conducted according to the IAAO Standard on Ratio Studies approved April of 2013. The sales database as received from Cook County Assessor’s Office (CCAO) included all sales from 2019, the assessed values of those sale properties at each of the three assessment levels (CCAO Initial values mailed to property owners, CCAO Final values after CCAO appeals, and—the final stage used to determine property tax rates and bills—BOR Final values after BOR appeals) and the appropriate assessment rates.

The study began by refining that database. Sales of less than \$100 were removed along with any sale whose assessed value at the Board of Review (BOR) level was 0. Next all multi-parcel sales were removed due to a lack of sufficient information to determine an appropriate value. Repeat sales of the same parcel within that twelve-month period were also removed for the same reason. Finally, the database was reduced to include only those properties in the norther third of the county.

A market value estimate was calculated by dividing the aggregate assessed value at the three levels ending with the BOR by the level of assessment specified in the sales listing by the county. Each of these three market value estimates were used to generate ratios using the SPSS software. The sales were further trimmed according to the IAAO Standard on Ratio Studies.

Two other steps were taken to adjust the number of parcels used:

1. Parcels were eliminated at the CCAO Final and BOR levels when their market value matched that of the previous level and
1. Parcels were eliminated at the BOR level when the market value was equal to the selling price. This reduced the samples at the CCAO Final and BOT levels to only those parcels whose values were changed and when the change at the BOR level was not “chasing” the selling price. The results will be discussed below.

This report begins with a report of ratios for all sales at each of the assessment levels.

	Count	Mean	Median	Weighted Mean	Price Related Differential	Coefficient of Dispersion
CCAO Initial	17,834	.975	.960	.981	.994	.164
CCAO Final	2,564	.909	.915	.943	.964	.182
BOR	2,598	.945	.937	.839	1.127	.136

The median ratio at the CCAO Initial level reveals an overall level of appraisal very close to 100% of market value, which indicates a sound overall appraisal. Even though it falls slightly with each succeeding level, the final median of .945 is well within the acceptable range of 0.90 to 1.10.

Even though the median shows an acceptable appraisal level, the overall quality of a mass appraisal is dependent on measures of variability around that median. The ideal would be for every ratio to fall exactly at 100%. When they invariably do not, we look to measures of variability to establish whether the variations fall within established industry ranges

The **Coefficient of Dispersion (COD)** is the measure of choice within the mass appraisal industry to establish the level of variability. Although the exact range will vary somewhat by property type, the final measure in

virtually all cases should be below 0.20. In other words, individual ratios should not vary from the median more than 20%.

The measures from the overall study are clearly within the industry standard of acceptability even though they change with each appeal level.

Finally, the **Price Related Differential (PRD)** reflects the degree to which properties at different price levels are appraised differently. One of the fundamental principles of mass appraisal is the use of standardized methods and approaches. The result of that application should be the equitable treatment of all properties regardless of their selling price. The PRD reflects an attempt to measure whether and to what extent properties are treated differently according to their price level.

It is calculated by dividing the mean by the weighted mean ratio for a group of properties. The ideal PRD measure is 1.00 and the acceptable range is from 0.98 to 1.03. Ratios falling below the lower limit of 0.98 tend to indicate that higher priced properties are being over appraised in relation to lower priced properties, a situation referred to as progressivity. The opposite is true when the PRD exceeds 1.03, with lower priced properties being over appraised in relation to higher priced properties, which is called regressivity. Because the majority of sales in virtually any database tend to reside at the center, the tendency of any comparison methodology is to pull the value of the lower priced properties up while pulling the value of the higher priced properties down.

The Price Related Differential is best at the CCAO Initial level. The measure at the CCAO Final level indicates a bias against the higher priced properties while this measure at the BOR level goes very severely in the opposite direction, favoring the higher priced properties.

The chart on the following page displays the results by class at each level using the primary ratio statistics. Notice how the statistics change. Also note how the number of appeals drops at the CCAO Final level, then increases at the BOR. This would indicate that owners whose value did not change from the CCAO Initial to the CCAO Final levels appealed to the BOR, resulting in a value change.

Take for an example, property in class 208. At the CCAO Initial level the median was very close to 100%, the PRD was only slightly high at 1.035 and the Coefficient of Dispersion was at a very low level at .142. There was very little change and the CCAO Final level with the COD creeping up slightly. At the BOR level the PRD increases to 1.053, indicating a bias against lower valued properties.

This type of analysis is helpful in focusing county efforts on those property types where there is an apparent problem.


Shading in the Count column indicates a sample less than 30, or a sample small enough to produce questionable results. The green shading indicates a ratio statistic within acceptable limits.


	CCAO INITIAL			
	Count	Median	Price Related Differential	Coefficient of Dispersion
100	212	0.455	0.869	0.717
202	642	0.933	1.041	0.165
203	3337	0.973	1.031	0.154
204	751	0.992	1.036	0.165
205	581	0.979	1.043	0.192
206	482	1.033	1.038	0.188
207	497	0.962	1.014	0.109
208	237	1.069	1.035	0.142
209	124	0.989	1.061	0.204
210	53	0.996	1.009	0.168
211	255	0.928	1.021	0.144
212	13	1.017	1.098	0.252
213	4	13.688	2.966	0.613
234	1,193	0.982	1.018	0.124
241	18	0.334	0.861	0.668
278	1,807	1.005	1.015	0.112
295	1,353	0.967	1.003	0.102
299	5,886	0.922	1.005	0.144
314	6	0.740	0.983	0.073
318	4	1.205	1.059	0.138
399	9	0.772	1.101	0.229
517	107	1.041	1.260	0.543
522	10	1.793	1.331	0.485
523	16	0.966	1.325	0.445
528	5	0.836	1.297	0.491
529	10	1.043	0.966	0.212
531	7	5.369	0.949	1.535
580	2	2.390	1.000	0.404
589	16	1.053	0.981	0.093
590	6	0.834	1.054	0.445
592	20	1.196	1.276	0.445
593	121	1.140	1.276	0.255
597	12	1.330	1.285	0.585
599	21	1.334	1.008	0.228
663	17	0.923	1.332	0.174
	17,834	0.960	0.994	0.164

	CCAO FINAL			
	Count	Median	Price Related Differential	Coefficient of Dispersion
16	0.900	0.960	0.208	
21	0.991	1.053	0.210	
218	0.969	1.020	0.161	
82	0.966	1.028	0.186	
64	1.028	1.043	0.166	
132	1.006	1.030	0.176	
32	0.939	1.005	0.155	
53	1.000	1.034	0.172	
26	1.012	1.116	0.221	
3	0.934	0.880	0.177	
29	0.950	1.025	0.154	
5	0.492	0.982	0.645	
1	9.452	1.000	0.000	
87	0.983	1.008	0.124	
222	0.990	1.018	0.109	
22	0.847	0.976	0.159	
1,506	0.882	1.014	0.164	
9	1.000	0.850	0.256	
1	0.670	1.000	0.000	
1	0.136	1.000	0.000	
1	1.000	1.000	0.000	
2	0.877	0.894	0.222	
1	14.753	1.000	0.000	
1	1.398	1.000	0.000	
2	0.484	1.038	0.074	
1	1.001	1.000	0.000	
5	1.000	0.909	0.361	
17	0.713	1.132	0.413	
1	3.916	1.000	0.000	
3	1.000	0.928	0.193	
2,564	0.915	0.964	0.182	

	BOR			
	Count	Median	Price Related Differential	Coefficient of Dispersion
11	0.873	1.046	0.112	
38	0.839	1.034	0.158	
346	0.905	1.029	0.141	
95	0.922	1.041	0.155	
61	0.935	1.030	0.166	
96	0.931	1.052	0.174	
45	0.913	1.018	0.095	
51	0.980	1.053	0.134	
21	0.831	1.076	0.213	
4	1.033	1.026	0.170	
42	0.863	1.025	0.140	
1	0.541	1.000	0.000	
151	0.915	1.015	0.113	
289	0.938	1.023	0.112	
104	0.994	0.997	0.066	
1106	0.951	0.993	0.096	
2	0.648	1.174	0.154	
3	0.789	1.069	0.132	
30	0.679	1.323	0.499	
4	1.974	1.016	0.423	
6	1.287	1.113	0.206	
2	0.387	1.487	0.513	
7	0.704	1.014	0.146	
6	2.943	0.822	0.787	
2	1.769	1.000	0.241	
4	0.798	0.975	0.099	
1	0.173	1.000	0.000	
5	1.079	1.571	0.434	
43	0.774	1.330	0.281	
6	1.025	1.529	0.537	
8	1.000	0.975	0.157	
8	0.710	1.457	0.234	
2,598	0.937	1.127	0.136	

LEGEND

 Indicates a sample less than 30, or a sample small enough to produce questionable results.

 The green shading indicates a ratio statistic within acceptable limits.



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