



How We Analyzed Commercial and Industrial Property Assessments in Chicago and Cook County

An in-depth analysis of hundreds of thousands of property tax records under Cook County Assessor Joseph Berrios

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December 7, 2017

Introduction

Alongside this analysis, please also see the [investigation](#). See the [ProPublica Data Store](#) to download the data behind this analysis and the [code](#) used to analyze the data.

Property tax assessments in Cook County have long been a source of controversy, especially for commercial and industrial properties.

To better understand the fairness and accuracy of Cook County's commercial and industrial assessments and the relationship of those assessments to appeals, ProPublica Illinois and the Chicago Tribune conducted three separate analyses:

- An examination of the assessor's initial valuations — known as first-pass values — to determine how many stayed the same over multiple reassessment periods.
- Sales ratios studies, which compared the assessor's first-pass values to actual sales prices.
- An analysis of the number of appeals filed, the amount of reductions granted and which law firms represented the largest share of the market for commercial and industrial appeals in Cook County, based on the combined value of assessments they appealed.

These analyses examined non-incentive commercial and industrial property assessments (major class 5) produced under Cook County Assessor Joseph Berrios from 2011 to 2015. For the first analysis, the team also examined the 2003, 2006 and 2009 Chicago reassessments under the previous assessor, James Houlihan.

Among the results:

- For thousands of Chicago parcels, the first-pass values produced by the assessor's office under Berrios did not change over multiple reassessments. Experts say this would be nearly impossible if the office used valid appraisal models and did the work. Under Berrios, 67 percent of first-pass values were identical over two reassessments and 23 percent were identical over three reassessments – 2009, 2012 and 2015. Under Houlihan, just 1 percent of first-pass values were the same over multiple reassessments during the years examined in the study.
- Berrios' assessments of commercial and industrial properties in Cook County showed high rates of errors that far exceed industry standards. The assessor's office also routinely overvalued lower-priced properties while undervaluing higher-priced ones, resulting in inequities.
- Appeals were granted so frequently that many Cook County property owners who did not appeal likely paid more in taxes than they would have if they had appealed. In addition, assessments remained error-ridden and unfair even after the appeals process was complete.

These analyses were reviewed by Richard Almy, former executive director of the International Association of Assessing Officers (IAAO), as well as by ProPublica data reporter Hannah Fresques.

About Our Data

The analyses were based on several datasets:

- **Illinois Department of Revenue (IDOR) real estate transfer declaration data.** Known as PTAX or green sheets, the self-reported data provides information on sales of properties throughout the state. The data includes the classification of the property (such as commercial or residential), the sales price and whether the sale is an arm's-length transaction or a compulsory sale. In order to do a sales ratio study, the data was hand-checked to ensure no related parties were included in the analysis, among other exclusions. This entailed examining the buyers and sellers and flagging any who appeared to be related. The data comes from this PTAX declaration [form](#).
- **Cook County assessor's office (CCAO) assessment data.** This dataset consists of raw assessment data that the CCAO keeps on a mainframe computer and provided to the Chicago Tribune. (The CCAO does not include its market valuations for commercial and industrial properties on its website as it does for residential properties.) The data is compiled by Property Index Number (PIN), a unique identifier that geographically locates each parcel of property. Some buildings have a single PIN, but many properties include multiple parcels and thus multiple PINs. For instance, a building's parking garage and its retail space each may have its own PIN.
 - A [PIN](#) is a 14-digit number. Often, the county issues new PINs for certain parcels due to construction and development. Property owners may also request PINs to be divided or consolidated. County officials say they do not track these changes electronically, making it difficult to analyze PINs that have changed over time. The analysis of first-pass values in Chicago included only those PINs that did not change over the two time periods being examined.
- **Geographical data.** This dataset was built using mapping software that allowed PINs to be located within the triennial reassessment areas.
- **CCAO appeals data.** These records include data on each PIN that was the subject of an appeal. The data includes initial assessed values (estimates based on market data and building characteristics), second-pass assessed values (which incorporate adjustments based on appeals granted by the assessor's office) and the final assessed values (incorporating any successful appeals to the Cook County Board of Review). Attorney names are also included in this dataset.

Here's how the appeals process [works](#).

First-Pass Assessment Analysis

Methodology

This analysis involved examining the first-pass values produced by the CCAO for the city of Chicago to see how often those numbers changed over time, as would be expected, and how often they stayed the same.

First-pass values represent the starting point of the assessment process. They are supposed to be the assessor's best estimate of what properties would fetch in the open market.

To arrive at these estimates, assessors typically collect data on rents, expenses, sales, vacancy rates and other variables, then use those numbers to estimate the price that a commercial or industrial property would fetch on the open market. This estimated market value is then multiplied by the legally required assessment level to produce the property's assessed value. In Cook County, the assessment level for commercial and industrial properties is 25 percent, meaning a property with an estimated market value of \$1 million would have an assessed value of \$250,000.

In Cook County, properties are reassessed every three years on a rotating geographical basis. This analysis was limited to parcels within the city of Chicago triennial area in the 2003, 2006, 2009, 2012 and 2015 reassessment years. Berrios was assessor for the 2012 and 2015 reassessments; in 2003, 2006 and 2009, it was Houlihan.

The analysis of first-pass values under Berrios included only those commercial and industrial parcels in Chicago that had no change in PIN from 2009 to 2015. More than 40,000 parcels (40,284) qualified, more than three-quarters of the total number of commercial and industrial parcels in the city. The comparable analysis of Houlihan's first-pass values included approximately the same number of Chicago parcels (39,758) with constant PINs from 2003 to 2009. More than 34,300 parcels were in both samples.

The analysis was conducted by parcel, not by building, because many commercial and industrial properties are made up of multiple parcels that are valued independently. For example, a 20-story commercial property may consist of retail space on the ground floor, a garage above that, and office space on all other floors. In that case, each economic unit would have its own valuation and result in a separate property tax bill. It is possible, therefore, for the owner of a complex property to see the first-pass valuations change for some parcels but not for others.

Some properties with a single economic unit also have multiple parcels. In these cases, the assessor distributes the value on a percentage basis to each parcel. That means a change in one value would result in a change of the others.

The datasets provided by the CCAO did not list first-pass values by parcel. Instead, values were provided for the parcels' individual components. These values had to be aggregated to determine the total value the CCAO assigned to each parcel. Say a property includes land valued at \$100,000 and a small shop worth \$400,000. The PIN for the property as a whole would have an aggregated value of \$500,000.

Results

The [analysis](#) shows a large percentage of first-pass reassessments under Berrios remained the same over multiple reassessment periods. For example, 51 percent of the approximately 40,000 PINs in the analysis had the same first-pass value for the 2012 reassessment as the 2009 reassessment. For the 2015 reassessment, 39 percent of first-pass values were identical to the 2012 reassessment. Twenty-three percent of first-pass values were the same for all three reassessment periods.

By comparison, just 1 percent of first-pass values for the 2003, 2006 and 2009 reassessments conducted under Houlihan stayed the same from one reassessment to the next.

In cases when the first-pass values didn't change, many of the property owners filed appeals and won reductions that lowered their tax bill – only to see the value snap right back to the same first-pass value during the next reassessment.

To better understand how the CCAO under Berrios arrived at first-pass values, the variables used in the valuation models would have to be examined. However, Berrios has refused to release the market rents, expense, vacancy rates and other data used in the models.

Sales Ratio Studies, 2011-2015

Methodology

Sales ratio studies examine the accuracy and fairness of property assessments by comparing the values derived from mass appraisals to actual arm's-length sales. The assessor's office says it does not conduct sales ratio studies, a violation of industry standards.

No mass appraisal model produces 100 percent accurate results. Still, the values produced by the assessor should treat properties the same, meaning the ratios should cluster around the median. Known as uniformity, this is a bedrock principle of mass appraisals. For this analysis, assessment data from the CCAO (described

above) was matched to real estate transfer declaration data (PTAX) from IDOR using PINs, the tax year of the assessment and the deed year from the transfer declarations.

For each tax year, the CCAO's mass appraisals represent the assessed and market values of properties as of Jan. 1. Only sales that occurred within a year after that date were matched. Simple ratios were then calculated by dividing the CCAO's assessment and estimated market values by sale prices, minus the value of any personal property included in the purchase price. (*See below for more information on sales selection.*)

For ratios calculated on market value, any ratio above 1 indicates that the mass appraisal overvalued a property; a result below 1 indicates the appraisal undervalued it. For assessment ratios, any assessment level above 0.25 means the property was overassessed. Values below 0.25 means the properties were under-assessed.

One of the most important statistics produced in a sales ratio study is the coefficient of dispersion, or COD. The COD measures the distribution of the ratios relative to the median and produces a score that approximates the average percentage error. The International Association of Assessing Officers (IAAO) Standard on Ratio Studies states that CODs for income-producing properties should be around 20, although experts say they allow large, complex jurisdictions like Cook County some leeway. The COD measures random, or "horizontal," dispersion among the ratios in that it does not account for factors that may have influenced the errors, such as property value.

Another important measure is price-related differential, or PRD. This statistic measures regressivity, or "vertical" inequities in a mass appraisal. Regressivity occurs when higher-priced properties are undervalued and lower-priced ones are overvalued. The IAAO standards say PRDs should fall between 0.98 and 1.03. Any number above 1.03 shows undervaluation of higher-priced properties and overvaluation of lower-priced ones.

PRD scores test assessment bias by measuring inaccuracies in relation to a specific cause, the value of property. Other biases also can explain inaccuracies, including the size of a property, age, location, etc.

Together, the COD and the PRD indicate how well the tax burden is distributed. Numbers that fall outside of the IAAO standards indicate the distribution of the tax burden is unfair.

In addition to the median, the study also calculated several other measures of central tendency, including means (or average), weighted means and the median absolute deviation, or MAD, which is another way of measuring how spread out ratios are from the median. All of these measures were calculated on a variety of stratifications based on geography, property classification and year.

Sales Selection

Conducting the sales ratio study required creating a list of arm's-length property sales in Cook County between 2011 and 2015 after cleaning up and standardizing property tax transfer records from IDOR.

The study was conducted using the IAAO's Standard on Ratio Studies and Standard on Verification and Adjustment of Sales as a guide. Full code for the sales ratio study can be found [here](#).

The study looked only at commercial and industrial properties and focused on sales involving warranty and trustee's deeds.

The initial sample size was 4,903 sales. The sales selection process resulted in the loss of 1,537 records, or about 31 percent, for a final sample size of 3,366 sales.

Sales between relatives or other related parties as well as all foreclosure, auction, judicial and short sales were eliminated. Sales involving financial institutions, pension funds or Real Estate Investment Trusts (REITs) were excluded. Sales that included significant physical changes such as remodeling or demolition were also eliminated from the pool because they are not considered the best representation of arm's-length transactions. Any sale less than \$10,000 as well as sales involving religious organizations or municipalities were removed from the study.

The sales selection also was hand-checked for relationships between the buyer and the seller. Sales were flagged if the names were the same in the buyer and seller fields and if the LLC or organization selling or buying the property was found to be owned by the same person listed in the buyer or seller field.

Calculating Ratios

Sales ratios were calculated by dividing the assessor’s valuations by the sales prices. The sales prices used eliminated any personal property that was included in the sale. For example, if a high-rise made money from cell phone antennas on the roof, the value of those antennas was eliminated from the sales price. This is possible because transfer taxes on property are calculated on the value of real property only, not personal property. So the declarations capture the value minus personal property, known as the net consideration.

The analysis looked at commercial and industrial properties both together and separately. The study had 941 sales that were industrial and 2,425 sales that were commercial properties.

Results were calculated both for the assessor’s initial valuations, known as first-pass values, and for the values after appeals, which are used to calculate tax bills.

Results

The results of this analysis include various measures of uniformity and bias, as well as median assessment levels by year for commercial and industrial properties in Cook County. Results are stratified by triennial area and property classification.

The study presents both first-pass values as well as the final values after appeals to both the assessor and the Board of Review.

The Chicago Tribune previously conducted a similar sales ratio study on residential properties, which can be found [here](#).

IDOR also conducts sales ratio studies. The agency’s results are similar to those found in the current analysis. IDOR publishes its results [here](#). (*See Property Tax Statistics, Sales Ratio and Equalization Tables.*)

Under Berrios, the average coefficient of dispersion for first-pass valuations of commercial and industrial properties during the study period was 98, nearly five times the standard of 20. In 2012, the coefficient of dispersion reached 133, which is nearly seven times greater than the standard for both commercial and industrial properties. These scores mean the assessments were highly inaccurate. In 2015, the coefficient of dispersion was 66.

Standards set by the IAAO say any PRD score above 1.03 shows the assessments are regressive, meaning the system is unfair to people who own low-valued property. The average price-related differential, or PRD, under Berrios was 1.85, and in 2012 the PRD reached 2.33. In 2015, the PRD was 1.7.

The analysis also found the appeals process did not fix the problems with accuracy and unfairness. For final, post-appeal assessments, the average COD was 93 under Berrios and the average PRD was 1.83.

Appeals Analysis

Methodology

Data from the CCAO was used to see which law firms filed the most appeals for commercial and industrial properties in Cook County from 2003 to 2016. The office tracks appeals both to the assessor and to the BOR, along with outcomes. The scripts for this analysis can be found [here](#).

The data set includes a small group of unique, high-value properties – about 200 – that the assessor’s office does not value in the usual way. For these “letter properties,” the office produces an estimate based on specific data requested from the owner. These initial estimates can be challenged through “re-review,” a process similar to an appeal.

The 3.8 million records, which contained many spelling and typographical errors, were standardized using regular expressions and data cleaning tools in R, followed by extensive fact-checking and hand checks.

The analysis resulted in a list of 4,969 attorneys. The attorneys were then ranked by “market share,” or the total amount of initial assessed value represented in their appeals, and by the total amount of reductions that those appeals succeeded in obtaining. The name of each attorney’s respective firm also was obtained and added to the dataset so the data could be aggregated by firm.

Results

Illinois House Speaker Michael Madigan’s six-member law firm has filed appeals on nearly \$8.6 billion in commercial and industrial assessed value since Berrios took office. That is the highest of any firm in the analysis. During that time, Madigan & Getzendanner won reductions totaling 20 percent of that value, or more than \$1.7 billion.

The law firm of Crane and Norcross filed appeals on nearly \$7.9 billion in commercial and industrial initial values since Berrios took office and won reductions on more than 23 percent of that value, or \$1.8 billion.

Chicago Alderman Edward Burke’s firm, Klafter & Burke, filed appeals on more than \$4.7 billion in commercial and industrial assessed values and won reductions of \$864.9 million, or about 18 percent.

10 Law Firms Do Big Business in Assessment Appeals

A ProPublica Illinois-Chicago Tribune analysis of appeals data from the Cook County assessor’s office found that the firm of Madigan & Getzendanner dominates the market for commercial and industrial appeals in Cook County. Between 2011 and 2016, the firm filed appeals on properties that were initially assessed at nearly \$8.6 billion. That is nearly \$1 billion more than the second-place firm, Crane and Norcross.

Law firm	Total value appealed (assessor initial value)	Reductions granted by the assessor	Reduction rate	Number of parcels appealed
Madigan & Getzendanner	\$8.6B	\$1.7B	20%	4,283
Crane and Norcross	\$7.9B	\$1.8B	23%	16,611
O’Keefe Lyons & Hynes	\$5.0B	\$851.3M	17%	4,485
Klafter & Burke	\$4.7B	\$864.9M	18%	9,526
Worsek & Vihon	\$3.0B	\$784.5M	26%	6,078
Eugene L. Griffin & Associates	\$2.9B	\$618.8M	21%	4,693
Thomas M. Tully & Associates	\$2.9B	\$756.4M	26%	4,273
Liston & Tsantilis	\$2.8B	\$725.2M	26%	7,675
Mayer Brown	\$2.2B	\$439.2M	20%	1,265
Sarnoff & Baccash	\$2.1B	\$555.2M	26%	7,865

Note: Appeals data from the assessor’s office represents the best available means of estimating these law firms’ volume of business. The analysis examined each appeal, sought to identify the attorney and firm that filed it, and calculated the reduction granted by the assessor.

Source: ProPublica Illinois-Chicago Tribune analysis of Cook County assessor’s office appeals data

Credit: Sandhya Kambhampati, ProPublica Illinois