

Ratio Study Practices in the United States and Canada: Results of 2013 Survey

**BY THE TECHNICAL STANDARDS COMMITTEE,
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This paper explores current practices and issues in ratio studies by comparing states, provinces, and a few local jurisdictions not subject to review by a state/provincial oversight agency in terms of frequency of studies, standards used to evaluate results, and final use of results. The report includes an introduction and a narrative discussion of responses and some trends since 1989, but focuses on the most recent changes. The report also offers tables and appendices showing key findings, tabulated responses, and the individual responses from each jurisdiction.

In comparing responses to IAAO standards, either the 2010 or 2013 version of the Standard on Ratio Studies may have been used.

Introduction

The intent of this analysis is to continue to search for clarification of technical issues by exploring and reviewing state- and provincial-level ratio study practices throughout the United States and Canada. When possible, responses are compared to those from previous surveys. The current survey represents an update of the 2011 survey and adds some new content areas.

This section explores the history of ratio study surveys, provides historical perspective on the availability of standardized ratio study guidance, and describes the development of the 2013

The International Association of Assessing Officers (IAAO) Technical Standards Committee develops and maintains technical standards of professional practice in assessment administration, tax policy, and mass appraisal. The committee also provides input into technical assistance programs and projects regarding property tax administration, policy, and valuation of property.

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Director of Publications Christopher Bennett participated as IAAO staff liaison. Rick Anderson, tax policy specialist for the Idaho State Tax Commission, performed the data compilation and verification and provided invaluable assistance in interpretation of results and updating of all tabular data. Dennis Deegear, Director, Duff and Phelps, LLC, Austin, Texas, participated as a committee member during the time the survey was planned and the questions developed.

survey and its comparison with survey responses over time.

History of Ratio Study Surveys

Although the direct involvement of the IAAO Technical Standards Committee in ratio study surveys dates only from 2008, attempts to systematically survey national or international ratio study practices can be traced to at least 1975, when Dennis Deegear, then with the Texas Legislative Property Tax Committee, conducted the first known comprehensive survey with wide participation from U.S. states. A comprehensive survey was conducted in 1984 by Robert Gloudemans, then with the Arizona Department of Revenue, with responses from 44 states. Beginning in 1983, Alan Dornfest, with the Idaho State Tax Commission, periodically conducted comprehensive U.S. surveys, adding Canadian provinces and territories in 1989. Although IAAO staff provided assistance with the 1997 and 2003 surveys, the product was not adopted as a formal IAAO-sponsored task until 2008 when the survey was assigned to the Technical Standards Committee.

Availability of Standardized Ratio Study Guidance

Historically, little written material was available to provide a basis for standardization of ratio studies. The early literature includes a 1924 bulletin of the Kansas State Agricultural College titled, "Assessment and Equalization of Farm and City Real Estate in Kansas" (Agricultural Experiment Station 1924); a more systematic 1954 Federation of Tax Administrators publication titled, "Guide for Assessment-Sales Ratio Studies" (Committee on Sales Ratio Data 1954); and a U.S. Census Bureau series of publications begun in 1957 and continued every 5 years through 1982 titled, "Taxable Property Values and Assessment/Sales Price Ratios" (U.S. Department of Commerce 1985). By the late 1970s, IAAO was providing guidance through

materials including the *Improving Real Property Assessment* textbook (Almy 1978). This soon was followed by the first IAAO *Standard on Ratio Studies*, published in 1980 (IAAO 1980). By 1990, the IAAO *Property Appraisal and Assessment Administration* textbook (Eckert, Gloudemans, and Almy 1990) and an updated *Standard on Ratio Studies* (IAAO 1990) were available and were soon in wide circulation. There is now a 2013 version of the *Standard on Ratio Studies* (IAAO 2013) that reflects minor updates to the 2010 revised standard (IAAO 2010), and a 2011 publication, *Fundamentals of Mass Appraisal* (Gloudemans and Almy 2011), that replaced the 1999 *Mass Appraisal of Real Property* (Gloudemans 1999).

The current survey period overlapped the adoption of the 2013 *Standard on Ratio Studies*, so states may have used that version or the prior, 2010, version in various comparisons. Changes in the 2013 version of the standard were relatively minor and reference to one or the other version should not distort survey results.

Although these materials present many unified themes for ratio study practices, disparities in use and terminology still exist and make interpretation of survey responses somewhat subjective. The committee attempted to address this problem by personal follow-up contacts with many of the participants in the survey. Many of these follow-up interviews were conducted by Rick Anderson, on the staff of the Idaho State Tax Commission.

Survey Development

The 2013 Ratio Study Survey is the third conducted by the IAAO Technical Standards Committee. Although many of the prior questions were retained to permit longitudinal comparisons, a few areas needed clarification or are of greater importance today and therefore were updated or expanded. New questions were developed in response to emerging issues, such as the computation and use

of the price-related bias (PRB) statistic. Some questions were eliminated as no longer necessary.

In addition, the current survey was conducted as an online survey over the Web using the Survey Monkey® survey tool. Requests to respond to the survey were sent via e-mail with an embedded link to the IAAO Web page.

Responses were received from most Canadian provinces and U.S. states, the District of Columbia, and the County of Hawaii in Hawaii. The number of participants was lower than in 2011. For jurisdictions that responded in 2011, but not in 2013, the survey tables report the 2011 responses. A text version of the online survey, showing the original questions in their entirety, is provided in appendix A.

Comparison with Previous Surveys

Because of the continuing nature of this survey, it is possible to report not only on U.S. state and Canadian provincial practices but also on the incorporation of professionally accepted best practices. This latest 2013 survey shows, with a few exceptions, a continuation of trends noted in the 2008 and 2011 surveys especially with regard to the increasing use of horizontal and vertical uniformity standards by states and provinces. States and provinces have continued to move closer to IAAO uniformity standards in general, but despite a slight uptick in the number of states reporting confidence interval use and interest in the PRB for vertical equity measurement, most have not adopted IAAO guidance regarding technical issues, such as use of tests of statistical significance for level or uniformity measures.

Table 1 shows previously asked questions that were deleted in 2013 as well as new questions. Appendix B presents a comparison of the number of states and provinces responding to each question beginning with the 1994 survey. Results shown previously for a question relating to statistical measures used for both

direct and indirect equalization are not included in this table. The question was substantially reworded in 2008, when it was split into separate questions about direct and indirect equalization. There is therefore no long-term comparability. Results of the separate questions are shown beginning in 2008.

Table 1. Major question changes in 2013 survey

Questions in 2011 survey deleted in 2013
13. Do you attempt to determine representativeness of sales?
21. What type of disclosure document is used?
22. What office is initially responsible for accepting the disclosure documents?
23. Do you employ a unique identification system to track sale disclosure documents?
63. Have you taken fewer ratio study-related actions in the past 3 years?
Questions new to 2013 survey
32. How are your statewide ratio study statistical results made available?
46. Do you have a standard for price-related bias (vertical inequity) based on the PRB?

Survey Limitations

In reports on results of previous ratio study surveys (Dornfest 1993, 1995, 1997; Dornfest and Thompson 2004; Technical Standards Committee 2009, 2012), a great deal of confusion regarding ratio study terminology, techniques, standards, and use was noted. A certain amount of confusion is probably unavoidable, resulting from long-standing practices and local statutory guidelines, both of which are difficult to change.

After reviewing responses and clarifying feedback, the committee notes the following limitations because they may affect interpretation of trends among surveys:

- Forty-two states, the District of Columbia, and 8 provinces responded in 2013. The 2011 data was used to fill in gaps for 8 states and 2 provinces. Significant changes were considered unlikely in these nonparticipating jurisdictions.

- Hawaii and Delaware are unique in that they do not provide state oversight for local assessments. Responses for these states were from local jurisdictions and reflect local, rather than state, practices.
- An addition to the question on value-related fees (i.e., transfer taxes [question 16]) enabled the capture of transfer tax rates in 2013. These are shown in a comment field in both appendix C and D.
- In addition to questions that were deleted or added (table 1), some questions, over time, have been reworded substantially so that comparisons with prior years' results are not meaningful. This issue affects areas such as reliability and equalization.
- Despite an attempt by the committee to reword questions to eliminate confusion, some questions remained difficult for respondents to correctly interpret the committee's intent. This situation led to inadvertent mistakes in tallies of responses. In particular, the following concerns should be noted:
 - *Reliability* means use of confidence intervals and similar statistics for testing appraisal level or uniformity and compliance with standards. States and provinces that indicated they judge reliability other than by recognized statistical measures were not included as using reliability statistics.
 - Beginning in 2011, the question designed to establish the frequency of ratio studies (question 3) was reworded using the word *required*. This added to the confusion, with some respondents indicating that the studies were not required but their jurisdictions did them once a year. When caught, such answers were changed to reflect common practice. Consistency with prior survey responses cannot be assured.
- Some questions were too open-ended, for example, leading to reports of 17 types of disclosure documents with very little if any substantive difference between them. For this reason, a group of questions concerning disclosure documents was eliminated in 2013.
- Responses have been categorized to distinguish between state-mandated and statewide-implemented procedures to the extent possible. In some cases, it is possible to make a distinction between these two possibilities from the answers, for example, if a state's laws permit the ordering of adjustments to locally determined assessments but the state has not used this provision.
- The survey questions were reordered slightly in 2013. When practical, the 2011 order was retained as a template. Several questions were eliminated and the survey generally shortened.
- As in 2008 and 2011, questions about reliability and confidence intervals were not divided into direct and indirect equalization uses. This diminishes the accuracy of responses to this set of questions when states or provinces use point estimates for one type of equalization but not for another.
- Questions about methods used to detect sales chasing were reworded in 2011 and the same format was used in 2013. The 2008 survey asked respondents to rank the different methods according to "first choice, second choice, and so on." This was not very meaningful, and the subsequent surveys asked only which methods were used.

- Major subject area deletions in the 2013 survey involved questions related to sales disclosure documents and determining sample representativeness (see table 1).

Responses from U.S. States and Canadian Provinces

Table 2 shows the response rate of ratio study surveys since 1989. Key findings from U.S. and Canadian responses to major survey issues are summarized in table 3. Major ratio study practices and trends are presented beginning in 1989. Because there are fewer Canadian provinces than U.S. states and the number of Canadian respondents has fluctuated considerably, comparisons with previous provincial surveys may be misleading. Table 4 compares 2013 responses from both the U.S. and Canada on new and emerging issues first examined in 2011.

Appendix B presents a detailed tabulation of U.S. and Canadian responses from the 1994, 1997, 2003, 2008, 2011, and 2013

Table 2. Response rates

Survey Year	U.S. States		Canadian Provinces/Territories	
	Number	Percentage	Number	Percentage
1989	48/51	94%	10/12	83%
1992	47/51	92%	10/12	83%
1994	46/51	90%	7/12	58%
1997	51/51 ^a	100%	11/12	92%
2003	51/51 ^b	100%	12/13	92%
2008	51/51 ^c	100%	11/13	85%
2011	51/51 ^d	100%	9/13 ^e	69%
2013	43/51 ^f	84%	8/13 ^g	61%

Notes

^a Includes Washington, DC, and a composite of 2 of 4 Hawaiian counties

^b Includes Washington, DC, and 4 Hawaiian counties

^c Includes Washington, DC, and a composite of 2 of 4 Hawaiian counties

^d Includes Washington, DC, and 1 Hawaiian county

^e Includes only 1 Canadian territory

^f Includes Washington, DC, and 1 Hawaiian county

^g Does not include any Canadian territories

surveys. This material enables comparisons among responses from various years (keeping in mind the provisos regarding the rewording of questions).

Based on these data, the *typical* ratio study program is likely to include the following features:

- An annual ratio study of real property is conducted at the state or provincial level.
- Sales or a mix of sales and appraisals of real property are used to develop the ratio study.
- There is statutory authority to require disclosure of sale prices to administrative jurisdictions by means of mandatory disclosure and/or transfer fees, especially in Canada where each province has mandatory disclosure.
- Adjustments to sale prices are made primarily for personal property included in the sale price, time, and less frequently, financing.
- U.S. results are used primarily to equalize funding, advise local officials of assessment conditions, and determine the need for reappraisal.
 - Secondary uses of significant frequency are adjusting locally determined values, equalizing assessments of centrally assessed properties, and approving tax rolls.
 - The pattern of uses was similar in 2008 and 2011. Over time however, the number of states reporting the use of ratio studies to equalize centrally assessed properties has dropped sharply from 17 in 2008 to 8, both in 2011 and 2013.
- Canadian results are used primarily to monitor valuation accuracy. Note that a number of Canadian provinces are the assessing authority.

Table 3. Key findings from the 2013 Survey of Ratio Study Practices in the United States and Canada

				UNITED STATES									CANADA								
				Number of Responses									Number of Responses								
2003	2008	2011	2013	Survey Year>	1989	1992	1994	1997	2003	2008	2011	2013	1989	1992	1994	1997	2003	2008	2011	2013	
Q No.	Q No.	Q No.	Q No.	Topic	Total Responses>	48	47	46	51	51	51	51	43 ^a	10	10	7	11	12	11	9	8 ^b
2	3	3	3	Annual ratio study	35	37	35	41	41	43	43	44	6	4	1	6	8	8	7	7	
3	4	4	4	Conducted by state/province/territory	29	24	26	29	38	44	44	42	3	2	6	3	7	10	9	9	
4	5	8	7	Only sales used in ratio study	19	15	20	23	25	31	30	28	5	6	5	8	8	10	8	10	
5a	94	69	54	Personal property ratio study	6	10	9	8	7	6	6	6	0	0	0	0	0	0	0	0	
6a	100	NA	NA	Intangible personal property exemption	NA	32	25	32	38	40	NA	NA	NA	7	3	4	6	3	NA	NA	
7	12	74	58	Procedural audits in lieu of ratio study	NA	11	19	17	22	2	2	2	NA	5	2	3	3	1	0	0	
NA	11	72	56	Procedural audits used	NA	NA	NA	NA	NA	32	25	26	NA	NA	NA	NA	NA	6	8	7	
8a	16	20	14	Full disclosure of sales prices	24	33	30	35	37	36	37	37	5	7	6	9	11	11	9	9	
Sale Price Adjustments (used)																					
9	26	29	19	Time	11	13	14	15	18	21	23	23	2	8	4	9	4	6	7	6	
9	26	29	19	Financing	13	10	16	16	15	11	12	10	2	6	3	8	5	4	4	4	
9	26	29	19	Personal property	28	26	31	32	26	30	27	25	3	7	6	9	4	7	5	6	
Equalization Adjustments (Authority)																					
11c	30	51	38	Order reappraisal	12	20	22	31	31	28	30	33	1	2	2	1	1	0	2	4	
12	34	49	36	Trend by category	18	16	11	14	13	16	15	15	3	6	1	2	1	0	1	1	
12c	34	49	36	Give local officials a grace period	NA	NA	2	12	3	12	25	10	NA	NA	0	2	1	1	1	0	
12d	34	49	36	Other	NA	NA	11	4	10	12	16	16	NA	NA	6	3	0	0	0	2	
13a	48	57	44	Uniformity Standards for COD/COV	24	26	32	34	38	40	31	33	4	5	2	8	9	8	7	5	
13a	48	57	44	More stringent than IAAO	3	1	6	1	5	6	3	0	2	0	1	1	4	2	0	0	
13a	48	57	44	Less stringent than IAAO	18	9	21	23	21	11	5	4	NA	NA	3	6	3	0	0	0	
13a	48	57	44	No standard	23	20	18	17	13	12	20	18	6	3	2	3	3	3	0	5	
13a	48	57	44	IAAO standard for one or more types	NA	NA	NA	NA	23	23	26	29	NA	NA	NA	NA	5	6	7	5	
13b	55	58	45	Vertical Equity Standards for PRD	NA	11	11	18	22	27	28	30	NA	2	2	4	6	5	6	6	
13b	57	58	45	IAAO standard: PRD = 0.98–1.03	NA	2	8	12	17	23	25	25	NA	1	2	2	5	5	6	6	
13b	57	58	45	Standard range differs from IAAO	NA	9	3	4	5	4	3	5	NA	1	1	1	1	1	0	0	
13b	57	58	45	No standard	NA	34	35	34	28	25	23	21	NA	8	4	7	6	5	3	4	
NA	NA	NA	46	Computes the PRB	NA	NA	NA	NA	NA	NA	NA	5	NA	NA	NA	NA	NA	NA	NA	0	
Testing Assessment Level																					
14a	35	53	41	Statutory ±10%	17	10	11	15	16	16	19	21	3	2	1	4	1	3	3	6	
14a	35	53	41	Statutory ±5%	6	5	5	6	6	4	5	5	0	2	2	2	2	2	3	2	
Assessment Level																					
16	70	NA	NA	100% market value for residential	14	27	17	22	23	26	NA	NA	5	5	6	6	8	9	NA	NA	
NA	NA	53	40	Statutorily set assessment level	NA	NA	NA	NA	NA	NA	43	43	NA	NA	NA	NA	NA	NA	5	3	

NA = not asked/compiled

Notes

^a The number in Total Responses for 2013 does not include the 8 states (DE, IL, MA, OH, PA, SD, VT, and WV) for which responses to the 2011 ratio study survey were used. The 2011 responses from these states are included in the totals for each question.

^b The number in Total Responses for 2013 does not include the 2 provinces (NB and NF) for which responses to the 2011 ratio study survey were used. The 2011 responses from these provinces are included in the totals for each question.

Table 4. New and emerging issues in ratio studies in the United States and Canada first identified in 2011

Issue	U.S. States		Canadian Provinces	
	2011	2013	2011	2013
Sales time period				
Mostly before assessment date	23	20	7	6
Overlapping	9	5	0	3
Mostly after assessment date	11	6	4	0
Statewide ratio study statistics	29	29	6	4
Fewer ratio study oversight actions in the past 3 years	12	NA	0	NA
Foreclosure-related sales used	17	18	1	0
Type of software				
Custom, written in-house	23	22	4	5
CAMA vendor application	6	8	1	1
Spreadsheet (e.g., Excel®)	25	23	6	5
Statistical software (e.g., SPSS®)	19	18	7	7
Database software	14	12	4	3

NA = not asked

- Level and uniformity standards are used for gauging performance or compliance with ratio study standards; these are often similar to IAAO ratio study standards.
- Results are calculated on the basis of samples for which there is generally no predetermined minimum size.

Despite strong recommendations in the *Standard on Ratio Studies* (IAAO 2010, 2013) for the use of confidence intervals in ratio studies designed to test compliance with appraisal level standards, states have been slow to adopt this provision. In 2013, there was a small increase in such use of reliability measures by U.S. states.

Appendix C presents the detailed responses from each U.S. state, and appendix D lists the responses for each Canadian province. These tabulations provide a complete rendition of responses, except in a few instances in which it became evident from the responses that the wording of the question may have caused confusion. In

these instances, the responses are judged as not meaningful and are not reported in the tables.

Several of the questions presented respondents an opportunity to elaborate on procedures or circumstances (see table 5). Many of these more elaborate answers have been included in appendices C and D of this report. Often, these questions were discretionary or did not apply to certain jurisdictions. As a result, responses are included only for certain states and provinces.

Table 5. Questions from the 2013 survey with additional response information

Question Number	Description of Topic
5	How ratio study is used
7, 8	Comments on use of sales and appraisals in ratio study
10	Comments on time period for ratio study sales
13	Description of sales validation audit policy
16	Description of transfer tax
20	Methods used for time adjustments
23	Comments on sample size goals
28	Comments on use of confidence intervals to test appraisal level
34	Comments on outlier trimming procedures
36	Methods used to order adjustments to locally determined values
41	Specific standards for appraisal level
42	Methods or authority for setting appraisal level standards
44	Specific standards for uniformity based on the COD
45	Specific standards for vertical equity based on the PRD
47	Description of actions resulting from failure to meet uniformity standards
52	Comments on techniques used to test sales chasing
53	Comments on lower limit for COD as indicator of sales chasing
55	Uses of personal property ratio studies
57	Types of property subject to procedural audits
59	Uses of procedural audits
61	Comments on software used for ratio studies

Raw data from the survey is available on the IAAO website at IAAO.org in the Resources dropdown menu under IAAO Surveys.

Recent Trends in the United States

Within the limitations noted, the questions in the current survey and the number of responding jurisdictions were similar to those in previous ratio study surveys. While respecting the constraints and other concerns noted, the committee was often able to compare changes in U.S. ratio study practices over time.

General Trends

The number of states performing annual ratio studies increased slightly from 43 in 2011 to 44 in 2013. Many states combine sales and appraisals although most use sales only. There is little change in this area. As was reported in 2011, only California still bases its ratio study exclusively on appraisals. In this state, assessed value only equates to market value upon a property's sale or when current market value is less than or equal to the adjusted sale price, so assessments in general do not reflect market value as indicated by sale prices.

The number of states performing personal property ratio studies increased from 6 to 10 between 1989 and 1992. However, this indicator has been steadily decreasing since then; only 6 states continue to perform ratio studies on personal property in 2013 and this number has been unchanged since 2008. In 2008, the last year this question was asked, personal property ratio studies were conducted based solely on appraisals.

The number of states conducting procedural audits decreased from 32 in 2008 to 25 in 2011, increasing slightly to 26 in 2013. Only 2 states, New York and California, continue to indicate that they conduct such audits instead of ratio studies. Procedural audits typically are conducted to provide information about selected property categories for which

there is little market activity or when use value and other constraints not directly related to the market are in place. The results of procedural audits may be used to determine compliance. The number of states ordering equalization or reappraisal from procedural audits decreased from 8 in 2011 to 4 in 2013.

Disclosure of Sale Price

There are three elements of disclosure: full mandatory sales price disclosure, transfer fees, and mandatory recordation of any transfer instrument. There are 5 states that do not require these elements as statewide policy: Alaska, Idaho, Missouri, Texas, and Utah. However, the limitation is not as severe in Missouri because several major local jurisdictions have full disclosure; thus only parts of the state are without sale price disclosure requirements.

Many states have transfer taxes based on sale price. Some of these states also have full disclosure. Unfortunately, confusion between mandatory disclosure laws, per se, and transfer taxes, which are based on sale prices and may implicitly require disclosure may have resulted in mis- or over-reporting of states with actual mandatory disclosure laws. Although nominally unchanged from 37 states, there is a strong indication that the "disclosure" laws in the District of Columbia, Florida, Illinois, New Jersey, and Pennsylvania are, in fact, transfer tax laws with some requirement for sale price to be listed. This issue will need to be examined further in future surveys.

The number of states reporting that disclosed sale prices are confidential increased from 7 in 2011 to 9 in 2013, the same number reporting this provision in 2008.

Although mandatory recordation does not provide complete information, the number of states reporting this element of disclosure increased from 28 in the 2011 survey to an all-time high of 32 in 2013.

Sampling Issues

Eighteen states now report use of foreclosure-related sales. This number grew by 1 since 2011, as Alaska, the District of Columbia, Rhode Island, and Texas started the practice, while Minnesota, Nevada, and Oregon ended their use.

In terms of the sales period used for ratio study sales, fewer states indicate using periods overlapping or after the assessment date than in 2011. Six states now use a period mostly after the assessment date as opposed to 11 which did so in 2011; 5 states use an overlapping period now as opposed to 9 in 2011.

The number of states reporting use of adjustments to sale prices is similar to that reported in 2008 and 2011. However, between 2011 and 2013, the number adjusting for financing decreased from 12 to 10 and the number adjusting for personal property decreased from 27 to 25. The number of states adjusting for closing costs held steady at 8. (It is notable that this number was only 2 in 2003.) Similarly, the number adjusting for brokerage fees rose from 2 in 2008 to 4 in 2011 to 6 in 2013.

With regard to methods used for determining time adjustments, the number reporting tracking ratio study trends rose from 15 to 21 between 2011 and 2013.

Two states indicate use of overall adjustments. Florida makes a significant overall adjustment while Washington makes a nominal 1 percent adjustment for personal property presumed to be included in each sale price.

Use of Ratio Studies

The ratio study has traditionally been used in an *advise-and-assist* role. There is little change in the number of states reporting this use from 2008 to 2013.

As in 2011, 20 states report that they may use ratio studies to order adjustments to locally determined values. Such adjustments may be in the form of direct equalization or trending orders in 17 states. Of these, 15 states indicated they

may trend by class or category, while 2 trend by jurisdiction. Indiana and Oregon, 2 states that previously had indicated trending by category or class of property, no longer indicate use of such a procedure. Previous surveys have shown that the number of states that would apply trends to individual categories of property has varied considerably over time. Of the 33 states that indicate they may order reappraisal, 20 also indicate that such orders may be contingent on ratio study results.

Only 7 states have taken action to order adjustments and 7 states have ordered reappraisals in the past 3 years. Both of these numbers are down in comparison to long-term trends. However, the 2013 results are similar to those reported in 2011 and may reflect incomplete recovery in markets hit hard by the last recession. Previous surveys showed the number of states that would apply trends to individual categories of property has varied considerably over time.

States using ratio studies to adjust locally determined assessed values often have reported giving local officials a grace period to reach compliance. Although the number of such states appears to have decreased markedly, from 25 in 2011 to 10 in 2013, the current number is close to the 12 reported in 2008.

In 2011, the survey reported that the number of states using ratio studies to equalize centrally assessed properties decreased significantly, from 17 in 2008 to 8 in 2011. This number remains unchanged in 2013. In addition, the number of states reporting using ratio studies to approve the tax roll decreased from 13 to 9 between 2011 and 2013.

Uniformity Standards

The number of states reporting no horizontal uniformity standards increased from 12 in 2008 to 20 in 2011 and 18 in 2013. Concomitantly, the number of states with standards for horizontal uniformity decreased from 40 in 2008 to 31

in 2011 and then increased to 33 in 2013. Of the 33 states reporting use of some standards, 29 have standards similar to those recommended in the *Standard on Ratio Studies* (IAAO 2010, 2013). In 2011, Michigan indicated it had uniformity standards that vary by region, but it did not answer this question in 2013. General uniformity standards are based predominantly on the coefficient of dispersion (COD). Although 11 states calculate the coefficient of variation (COV), only 2 states, Florida and Utah, indicate that compliance is based on this statistic. By contrast, 43 states calculate the COD, and 21 use it as a basis for compliance with uniformity standards.

The number of states that have developed price-related differential (PRD) standards continues to increase, from 28 in 2011 to an all-time high of 30 in 2013. As was the case in 2011, 25 of these states use the specific guidelines in the IAAO *Standard on Ratio Studies* (2010, 2013). This represents the most widely used guidance found in the IAAO standard. Note that although Michigan did not answer this question in 2013, in 2011 that state reported standards based on the PRD that vary by region.

Five states indicate that they calculate the new price-related bias (PRB) statistic and 1 state, Florida, indicates testing compliance using this statistic.

Thirty-one states report that they can initiate action on the basis of poor uniformity, while 17 states indicate that they cannot. Two states, Massachusetts and Michigan, did not answer the question. The most typical action is ordering reappraisal, which can be done in 22 of these states.

Twenty-one states indicate that they test the reliability of the COD, while 7 test the reliability of the PRD. These numbers are similar to those noted since 2008. Ten states take reliability into account when making decisions or determining compliance with uniformity standards. In 2008, a total of 9 states

reported basing compliance with uniformity standards on reliability measures, but this number fell to 6 in 2011 before returning to near 2008 levels in 2013.

Level Standards

A level standard is defined as the specified range of acceptability around a required assessment ratio. Such ranges may be provided by statute but, more frequently, are established by an administrative or oversight agency. Many states have established ranges of this type. However, the number of states with a *no allowable variance* standard for assessment level could not be determined from the responses to either the 2011 or 2013 survey. The question was reworded in 2011; 7 states left the question blank in 2011 and 8 did so in 2013, with 2 of these states, Illinois and Michigan, reporting statutory requirements but no range. In 2008, there were 15 states that reported no allowable variance. The IAAO *Standard on Ratio Studies* (2010, 2013) recommends a range of -10 to +10 percent for direct equalization of locally determined values and a range of -5 to +5 percent for indirect equalization of funding distributions. The number of states using the ± 10 percent parameter grew from 16 in 2008 to 19 in 2011 to 21 in 2013, while the number using the ± 5 percent parameter increased from 4 in 2008 to 5 in 2011 and remains at 5 for 2013. Overall, the number of states with some allowable variance grew from 42 in 2011 to 43 in 2013 with the addition of New Hampshire and Washington and the deletion of Michigan.

Reliability of Level Statistics

When the principles of statistical sampling error are applied, ratio studies tend to be more reliable for large, uniform samples and less reliable when these conditions are not met. The number of states indicating they test reliability and use this information for compliance purposes appears to have increased in 2013 following decreases in both 2008 and

2011. Because questions were reworded in 2011 and there continues to be confusion about this concept, it is not clear that long-term comparisons are valid.

Currently, 17 of the states that use ratio studies to test compliance with level standards do so on the basis of reliability statistics rather than point estimates, which are used in 27 states. In 2011, 14 states indicated similar use of reliability statistics. Of the 42 states that use ratio studies for equalization or to order re-appraisal, 15 use confidence intervals in helping to make this determination; 27 use point estimates for this purpose. Note that these counts include Hawaii, in which the County of Hawaii uses reliability statistics for internal controls and valuation adjustments.

Since 2008, the survey has examined a special situation in which lower levels of confidence or point estimates might be appropriate, as described in the IAAO *Standard on Ratio Studies* (2010, 2013). To do this, the survey asked whether a decision based on reliability statistics could be based on point estimates or lower levels of confidence given long-standing non-complying point estimates. This practice has been the recommendation in the IAAO *Standard on Ratio Studies* since 1999. Few states have adopted this provision with only 2, Hawaii and Idaho, reporting using lower degrees of confidence and no states switching from confidence intervals to point estimates in 2013.

Measures of Assessment Level

States typically compute three measures of level: the mean, the median, and the weighted mean. Although similar numbers of states compute these statistics, either the median or the weighted mean predominates for equalization purposes. Beginning in 2008, the survey further distinguished between statistics used for direct and indirect equalization.

There is little change between 2011 and 2013 in the use of the various measures of level for direct or indirect equalization. The median remains the

dominant statistic used for direct equalization, with 17 states indicating use of this measure in 2013. The number of states using the weighted mean for direct equalization decreased slightly from 5 to 4, and those using the arithmetic mean for this purpose decreased from 9 in 2008 to 3 in 2011 to only 2 in 2013.

The most significant change in the area of indirect equalization is the decrease in the number of states reporting use of the median for this purpose. While 17 states used the median this way in 2011, 14 indicate doing so in 2013. The IAAO *Standard on Ratio Studies* (2010, 2013) differentiates between direct (change property values) equalization and indirect (alter funding) equalization, suggesting that the median is more appropriate for the former and the weighted mean, conceptually, is more appropriate for the latter.

Outliers

The 36 states indicating in 2013 that they identify outliers is similar to that reported in 2003, 2008, and 2011. Since 2008, the survey has been expanded to explore methods of outlier identification and trimming. Despite considerable treatment of this subject in the *Standard on Ratio Studies* (IAAO 2010, 2013), no particular method prevails in practice. However, use of fixed asymmetric points to remove observations increased from 1 state in 2011 to 5 states in 2013.

Sales Chasing

The number of states with statutory requirements for testing for sales chasing returned to 3 in 2013 after increasing to 5 in 2011. In addition to Michigan, Texas, and Wyoming, which have statutory requirements, 11 states have nonstatutory requirements to test for sales chasing, up from 9 in 2011.

The number of states testing samples for sales chasing decreased slightly from 31 in 2011 to 30 in 2013. This question was revised in 2011 to enable states to list methods employed for detecting sales

chasing. The question no longer requests ranking the various methods, so the 2011 and 2013 results are not comparable with those from 2008. In 2013, the most commonly used technique is comparison of average percentage appraised value changes on sold and unsold parcels; 20 states report use of this method. The number of states establishing a lower limit on the COD as a possible indicator of sales chasing has increased from 6 in 2011 to 8 in 2013. Of those 8 states, 4 indicate they follow IAAO guidance and use a lower limit of 5 on the COD.

Sample Size and Representativeness

Uncertainty continues regarding any minimum sample size standard that should be used for evaluating assessment performance based on a ratio study. There is considerable variance among jurisdictions which has not changed significantly between 2003, 2008, 2011, and 2013.

The number of states indicating that they may test samples for representativeness decreased from 32 in 2003 to 21 in 2008, but then increased to 26 in 2011. The question was not asked in 2013.

Legal Action

In 2013, 21 states indicate that ratio studies could result in legal action, which is considerably fewer than the 37 states citing this possibility in 2003. In 19 states, taxing jurisdictions can initiate legal actions using ratio study results, while in 11 states, taxpayers can initiate such actions. Some states indicate that legal actions can be commenced by either of these parties.

Recent Trends in Canada

Responses to this year's survey were received from 8 of the 10 Canadian provinces but no territories. New Brunswick and Newfoundland did not participate in the 2013 survey, but their 2011 survey responses were used. Manitoba, which had not responded in 2011, did participate in 2013. In the few instances in

which significant trends were apparent, they have been noted. In other cases, the general nature of Canadian ratio studies is discussed with comparison in some instances with U.S. practices.

General Trends

The number of provinces performing annual ratio studies is unchanged with 7 reporting this practice in 2013. Nine provinces report that the ratio study is performed at the provincial level; however, 2 also report that local officials perform ratio studies. In one case, the province of Ontario, only local officials are reported doing the ratio study.

Although previous surveys reported Alberta as adding appraisals to sales samples, in the 2013 survey, all Canadian respondents indicate that ratio studies are based solely on sales samples.

Personal property is known to be exempt in most provinces. None of the provinces conduct personal property ratio studies.

All reporting provinces, except Manitoba, Nova Scotia, and Quebec, indicate that they use procedural audits. This response reflects a slight decrease from the 8 provinces reporting this use in 2011.

Disclosure of Sale Price

All Canadian provinces except Nova Scotia have full disclosure, and all but Alberta have transfer fees.

Sampling Issues

In contrast to U.S. states where the use of foreclosure-related sales is a significant issue, no Canadian province reports using these sales in its ratio study. Alberta did report use of such sales in 2011.

In terms of sales period, 6 provinces indicate using sales occurring mostly before the assessment date, while 3 use overlapping periods.

Adjustments for time and personal property are the most common and occur at about the same relative frequency as in the United States. Time adjustments are usually made by applying trending

in ratio study results. This is the main method reported in 5 provinces. No Canadian jurisdiction makes overall adjustments at this time, and none have reported doing so since 1997.

Use of Ratio Studies

Ratio studies are predominantly used as a tool to advise local jurisdictions or to assist mass appraisal programs. Interestingly, the number of provinces reporting their use to adjust locally determined values grew from 1 in both 2008 and 2011 to 3 in 2013. Besides Saskatchewan, the 1 province to indicate this use in 2011, Alberta and Prince Edward Island now report applying such adjustments, when necessary. In addition, Alberta is now the only province to indicate use of ratio studies to equalize provincial funding of local jurisdictions. Previously, Quebec also had reported such use. As in 2011, Quebec and Saskatchewan indicate that they can use the study to order reappraisal. As has been the case since 1997, none use ratio studies to adjust utility (centrally assessed) values. Regardless of authority, no province has actually ordered reappraisal or adjustments to locally determined values in the past 8 years.

Level and Uniformity Standards

Use of uniformity standards in 2013 is slightly lower than that reported in 2008 or 2011, with 5 provinces now indicating they use such standards, while 8 did so in 2008 and 6 did so in 2011. The reporting provinces use standards similar to those in the IAAO *Standard on Ratio Studies* (2010, 2013).

Six provinces continue to report use of PRD standards with all 6 citing the 0.98–1.03 range in the IAAO *Standard on Ratio Studies* (2010, 2013).

In 2013, 3 provinces indicate that they can initiate reappraisal action based on uniformity. In 2011, 4 provinces indicated that reappraisal action could be initiated on this basis.

The number of provinces report-

ing use of specified allowable variance ranges for assessment level was 8 in both 2008 and 2011, but encompasses all 10 in 2013. Of these, 6 use a range of –10 to +10 percent for this purpose (an increase from 3 provinces in 2011). Two provinces use a tighter range of –5 to +5 percent. Saskatchewan and Ontario report use of a ± 2 percent range, although in Ontario, allowable variance is based on market type and property type.

Reliability

In 2013, only 3 provinces, Manitoba, Ontario, and Quebec, report using confidence intervals to determine compliance. None of these provinces, however, use ratio studies in other than an advise-and-assist function. No province indicates that it lowers the level of confidence needed to find noncompliance after the calculated (point estimate) measure of level has been out of the desired range for several years. Most provinces (9) do not use confidence intervals to determine compliance. Further, in Quebec, the only province indicating some compliance action based on confidence intervals, the stated action is to advise the local jurisdiction. No funding consequences or value adjustment actions are taken.

The number of provinces testing the reliability of the COD and PRD decreased in 2013 from 6 to 5 for the COD and from 4 to 3 for the PRD. Although 2 provinces, Newfoundland and Prince Edward Island, indicate the possibility of ordering reappraisal based on uniformity conditions, no province reports that such a decision would be based on confidence intervals or other reliability measures.

Measures of Assessment Level

Canadian use of the various measures of assessment level is similar to that in the United States, with the median the increasingly predominant measure computed. In 2013, 8 provinces are calculating the median, while only 3 compute the mean or the weighted

mean. However, in Canada, assessment functions tend to be more concentrated at the provincial level or are carried out by quasi-governmental corporations that operate within the province. This practice has led to less use of ratio studies for equalization than in the United States. Therefore, compilations of statistics regarding measures of level used for various types of equalization are not very meaningful.

Normality

As in 2008 and 2011, 5 provinces report testing normality of the data distribution.

Outliers

The number of provinces testing for outliers increased from 7 in 2008 to 8 in 2011 and 2013. As in 2011, only Nova Scotia limits the percentage of outliers that may be trimmed (generally no more than 10 percent, but may allow up to 20 percent in extreme cases).

Sales Chasing

While no province indicates statutory requirements for testing for sales chasing, 3 provinces, Alberta, British Columbia, and Nova Scotia, now have nonstatutory requirements. This is an increase from the 1 province reporting such requirements in 2011. As in 2011, 5 provinces indicate they test for sales chasing with the predominant method the comparison of average percentage change in value technique.

Of the 3 provinces indicating nonstatutory requirements for testing for sales chasing, 2 provinces, Alberta and British Columbia, also report using a COD of less than 5 as a possible indicator of sales chasing. In addition, Ontario, which does not establish a lower limit based on the COD, did indicate that they prefer not to have CODs below 5.

Sample Size and Representativeness

Minimum sample size requirements generally are similar to those in the United States. Two provinces, Alberta

and British Columbia, do establish quotas or goals.

Four provinces indicated they tested samples for representativeness in 2011. This question was not asked in 2013.

Legal Action

The ability to initiate legal action as a result of ratio studies was reported in both Alberta and Nova Scotia. The action could be taken by taxing jurisdictions in both provinces. In addition, taxpayers could initiate legal actions in Nova Scotia.

Conclusions

Ratio studies remain critical for measuring, evaluating, and working toward the improvement of assessment practices in most places. The IAAO *Standard on Ratio Studies* provides detailed guidance on ratio studies. However, aside from isolated instances and especially regarding uniformity standards and statistics, no clear continuing trend has emerged of states and provinces adopting the more technical features of the IAAO standard.

The report on the 2003 ratio study survey (Dornfest and Thompson 2004) indicated that a growing number of states and provinces based assessment level compliance on confidence intervals and suggested that a major change in practice related to this issue might be developing. However, despite an uptick in 2013 in the number of states that base compliance decisions on confidence intervals rather than point estimates, this number has never returned to the high point of 20 noted in 2003. The practice simply has not been widely adopted. Along these lines, inconsistencies among the answers to multiple questions on this subject led the committee to conclude that the degree of understanding of statistical reliability measures remains deficient. As reported in 2008, the committee continues to believe that previous conclusions about trends in the use of such statistics may have been based on incorrect interpretation of survey

questions or responses. As a corollary in support of this conclusion, few states and provinces appear to have responded to the recommendation first found in the 1999 *Standard on Ratio Studies* (IAAO 1999) to lower the level of confidence when long-term inequities are apparent. The lack of response in this area suggests lack of understanding of the underlying statistical measures.

On a more positive note, many states and some provinces are using the methods outlined in the IAAO standard for identifying outliers and for detecting sales chasing. In future surveys, follow-up questions could explore issues of resolution once sales chasing is identified. In addition, the recently adopted price-related bias (PRB) statistic has come into wider (but not widespread) use, with 1 state even basing compliance decisions on this measure. It will be important to watch for additional use and adoption of this statistic.

Finally, general IAAO-recommended standards for level and horizontal and vertical equity have been widely adopted.

Although the 2013 version of the IAAO *Standard on Ratio Studies* was available at the time, most respondents to this survey relied on the 2010 version for guidance. The IAAO *Standard on Ratio Studies* continues the tradition of providing valuable guidance and assistance and is widely cited and used. It is hoped that this survey will provide focus for U.S. states and Canadian provinces and territories that are attempting to evaluate their ratio study systems as well as work toward internationally recognized guidelines. It also is hoped that these authorities will use survey results as an impetus to become more knowledgeable about the technical aspects of ratio studies that have not yet been incorporated into their practices.

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Appendix A. 2013 questionnaire for survey of ratio study practices in the United States and Canada

Background and General Questions

Q1: Enter your full contact information. (contact information will not be distributed or used except in relation to this survey)

Name (first last):

Title:

Jurisdiction:

E-mail address:

Phone:

Q2: What is your jurisdiction type?

- State agency
- Provincial agency
- Territory
- Local
- Other, describe (50 char limit):

Q3: How often does your jurisdiction conduct ratio studies? Indicate if annual or explain other variations.

- Annual
- Not required
- Other, describe (50 char limit):

Q4: Who conducts the state/provincial ratio study? (check all that apply)

- State/province/territory officials
- Local officials
- Contracted service provider (university or private company)
- Other, specify (50 char limit):

Q5: How is the state/provincial ratio study used? (check all that apply)

- To order adjustments to locally determined assessed values if necessary
- To equalize state or provincial funding of local jurisdictions
- To order local jurisdictions to reappraise
- To advise assessment officials of assessment conditions
- To assist mass appraisal programs
- To approve tax assessment roll
- To adjust or equalize centrally determined assessed values (such as utilities)
- Other (please specify):

Q6: Have you incorporated portions of the IAAO Standard on Ratio Studies in your statutes or rules and regulations?

- Yes
- No

Q7: Which of the following does your real property ratio study include?

- Sales only
- Appraisals conducted by or contracted by the state/provincial agency only
- Both sales and appraisals conducted by or contracted by the state/provincial agency

Q8: If the state/provincial agency uses both sales and appraisals, can they be combined in order to study one type or category of property?

- No
- Not applicable
- Yes, comments (240 char limit):

Q9: What was the assessment date tested with the state's or province's most recent ratio study?

Q10: What is the time period from which sales are used in the state/provincial ratio study? (check all that apply)

- One year
- Multiple years
- Flexible time period (varies by jurisdiction or category)
- Sale period mostly before assessment date
- Sale period mostly after assessment date
- Sale period equally before and after the assessment date
- Additional comments (240 char limit):

Data Acquisition and Screening

Q11: Which jurisdiction primarily performs the sales sample selection? (check all that apply)

- State/province
- Local
- Contracted service provider
- Both state/province and local
- Not applicable
- Other, specify (240 char limit):

Q12: Which jurisdiction primarily conducts the sales validation (screening)? (check all that apply)

- State/provincial agency
- Local
- Contracted service provider
- Both state/province and local
- Not applicable
- Other, please describe (240 char limit):

Q13: If the state/provincial agency does NOT conduct the sales validation, does the agency perform an audit of the sales validation process?

- Yes
- No
- Not applicable
- If yes, briefly summarize your audit policy (240 char limit):

Q14: Does your jurisdiction have a law requiring disclosure of real estate sale prices to assessment officials?

- Yes, disclosure made to state/province/territory officials
- Yes, disclosure made to local assessors
- Yes, disclosure made to both
- No

Q15: Are disclosed sale prices public records?

- Yes
- No
- Not applicable

Q16: Is a value-related fee charged (e.g., transfer tax, deed stamp) for real property transfers?

- Yes
- No
- If yes, state the rate(s) and describe the structure? (400 char limit):

Q17: Does your jurisdiction have a law making recordation/registration mandatory for real property transfers?

- Yes
- No

Sale Price Adjustments

Q18: Which of the following adjustments to sale price do you have authority to implement in your ratio studies? (check all that apply)

- No authority to implement adjustments
- Time
- Financing
- Personal property
- Closing costs
- Brokerage fees
- Intangible personal property
- Delinquent taxes
- Other, describe (240 char limit):

Q19: Which of the following adjustments to sale price do you use in your ratio studies? (check all that apply)

- Time
- Financing
- Personal property
- Closing costs
- Brokerage fees
- Intangible personal property
- Delinquent taxes
- Other, describe (240 char limit):

Q20: Which time adjustment methods do you use in ratio studies? (check all that apply)

- Tracking trends in sales ratios over time
- Tracking changes in value per unit over time
- Analysis of repeat sales
- Not applicable
- Other, describe (240 char limit):

Q21: Are blanket or global adjustments made to sales prices prior to computing ratios? (For example, some jurisdictions adjust all prices down by 1 percent in an attempt to adjust for personal property that is difficult to isolate sale by sale; others might adjust all sales by 10 percent for financing considerations.)

- Yes
- No
- If yes, describe (240 char limit):

Q22: Regarding sample size, what is the smallest sample you will use to evaluate any category of property?

- Less than 5 observations
- 5 to 9 observations
- 10 to 19 observations
- 20 to 30 observations
- More than 30 observations
- Other, describe (50 char limit):

Q23: Do you establish sample size quotas or goals (e.g., 3 percent of parcels in category or a number based on a statistical sample size formula)?

- Yes
- No
- If yes, please explain:

Q24: Check each measure of level that you calculate and indicate if it is used for direct and/or indirect (funding) equalization.

- ARITHMETIC MEAN calculate
- ARITHMETIC MEAN use for direct equalization
- ARITHMETIC MEAN use for indirect equalization
- MEDIAN calculate
- MEDIAN use for direct equalization
- MEDIAN use for indirect equalization
- WEIGHTED MEAN calculate
- WEIGHTED MEAN use for direct equalization
- WEIGHTED MEAN use for indirect equalization
- GEOMETRIC MEAN calculate
- GEOMETRIC MEAN use for direct equalization
- GEOMETRIC MEAN use for indirect equalization
- OTHER calculate
- OTHER use for direct equalization
- OTHER use for indirect equalization
- If other measure of level, specify (240 char limit):

Q25: Do you test the distribution of ratios to see if they are statistically normal?

- Yes
- No

Q26: Do you use confidence intervals (CIs) to determine statistical compliance with standards for appraisal level?

- Yes
- No
- Not applicable
- If yes, then skip two questions ahead

Q27: If the calculated level of assessment is 86% with a CI ranging from 76% to 95% for a particular group of properties, would you consider the level to be in compliance?

- Yes (the CI overlaps the required minimum level)
- No (the CI does not overlap 100%)
- Additional comments (240 char limit):

Q28: If the calculated level of assessment is out of compliance except for the CI for a particular group of properties, and the calculated level of assessment remains below the required minimum level for several years, which action would your agency take?

- Lower the level of confidence and reevaluate
- Base the compliance decision on point estimates
- Continue to find the jurisdiction in compliance
- Other
- Not applicable (CI not used to determine compliance)
- Additional comments (240 char limit):

Q29: Which measures or tests of price-related bias do you use? (check all that apply)

- Price-related differential (PRD) calculated
- PRD used to test for compliance
- Price-related bias (PRB) calculated
- PRB used to test for compliance
- Spearman-Rank calculated
- Spearman-Rank used to test for compliance
- Mann-Whitney Test calculated
- Mann-Whitney Test used to test for compliance
- t*-test calculated
- t*-test used to test for compliance
- Other, describe (240 char limit):

Q30: Are actions taken to correct price-related noncompliance?

- Yes
- No
- If yes, please describe (240 char limit):

Q31: Do you calculate confidence intervals or related tests of statistical significance around any of the following? (check all that apply)

- Coefficient of dispersion (COD)
- Price-related differential (PRD)
- Price-related bias (PRB)
- Not applicable

Q32: If you compute statewide/province-wide ratio study statistical results, how are they made available? (check all that apply)

- Website
- Publication
- Not made available
- Not applicable (we do not compute statewide/province-wide ratio study statistical results)
- Other, please explain (240 char limit):

Outlier Trimming

Q33: Do you trim outlier ratios?

- Yes
- No

Q34: If outliers are trimmed, what procedure do you use? (check all that apply)

- $1.5 \times$ interquartile range
- $3.0 \times$ interquartile range
- Beyond 2 standard deviations
- Fixed symmetric points (e.g., remove ratios <0.50 or > 1.50)
- Fixed asymmetric points (e.g., remove ratios <0.30 or > 2.00)
- Good judgment
- Look for logical break points
- Other, describe (240 char limit):

Q35: Is there a limit on the maximum percentage of sales that can be trimmed out of a sample? (e.g., 20%)

- No
- Yes
- Indicate percentage (50 char limit):

Ratio Study Standards and Enforcement

Q36: If you order adjustments to locally determined assessed or appraised values, which of the following procedures are used? (check all that apply)

- Order local officials to apply trending factors to individual classes or categories of property
- Trend all types of property equally based on a jurisdiction-wide adjustment factor
- Give local officials a compliance grace period to apply indicated factors
- No authority
- Other, describe (240 char limit):

Q37: How many local jurisdictions have been found out of compliance and ordered to ADJUST locally determined values in the past 3 years? (e.g., applying an adjustment factor)

Q38: Do you or another oversight agency have authority to order reappraisal of locally determined values?

- Yes
- No

Q39: How many local jurisdictions have been found out of compliance and ordered to REAPPRAISE locally determined values in the past 3 years?

Q40: Do you have a statutorily defined level(s) of assessment? (for example, 100% for all property or percentages that vary by property type)

- Yes
- No

Q41: What are your ratio study standards for acceptable level of appraisal?

- 0.95–1.05
- 0.90–1.10
- Other, indicate range (50 char limit):

Q42: If you have appraisal level standards, how are they set?

- Statute
- Administrative rule or regulation
- Other, describe (50 char limit):

Q43: Which of the following uniformity measures are calculated or used to make compliance determinations? (check all that apply)

- Coefficient of dispersion (COD):
 - calculated
 - used to test for compliance
- Coefficient of variation (COV):
 - calculated
 - used to test for compliance

Q44: If you have specific standards or requirements based on the COD, what is the highest acceptable COD for each of the following categories? (50 char limit per field, enter "NA" for categories that do not apply)

- Residential
- Commercial/Industrial
- Farmland
- Timberland
- Vacant land
- Other, specify

Q45: If you have a standard for price-related bias (vertical inequity) based on the PRD, what is the standard?

- PRD 0.98 to 1.03
- Other, describe (50 char limit):

Q46: Do you have a standard for price-related bias (vertical inequity) based on the PRB?

- Yes
- No
- If yes, what is the standard? (50 char limit):

Q47: What actions can your agency initiate as a result of assessment uniformity conditions? (check all that apply)

- None
- Order a reappraisal
- Withhold funding (e.g., revenue sharing)
- Other
- Additional comments (240 char limit):

Q48: Is the action dependent upon confidence intervals or related tests of statistical significance?

- Yes, for PRD
- Yes, for PRB
- Yes, for COD
- Yes, for COV
- No
- Not applicable

Q49: If your agency can order a reappraisal or withhold funding as a result of assessment uniformity conditions, how many times has it been done in the past 3 years?

Sales Chasing

Q50: Do you have statutory requirements to check for sales chasing?

- Yes
- No
- Nonstatutory requirement

Q51: Do you test for sales chasing?

- Yes
- No

Q52: If you test for sales chasing, what techniques do you use? (check all that apply)

- Comparison of average percentage changes in appraised values of sold and unsold properties
- Comparison of average unit values of sold and unsold properties
- Split sample technique (using sales before and after the appraisal date)
- Comparison of observed vs. expected distribution of ratios
- Mass appraisal techniques
- Additional comments (240 char limit):

Q53: Has a lower limit on the COD been established as an indicator of possible sales chasing?

- Yes
- No
- Additional comments (240 char limit):

Personal Property Ratio Studies

Q54: Is a ratio study conducted for personal property?

- Yes
- No
- Not applicable

Q55: How are the results of your personal property ratio study used?

- To order adjustments to locally determined assessed values
- To equalize state or provincial funding of local jurisdictions
- To order local jurisdictions to reappraise
- To advise provincial, state, or local jurisdictions of assessment conditions
- To assist mass appraisal programs
- To approve tax assessment roll
- To adjust or equalize centrally determined assessed values (such as utilities)
- Other, please describe (240 char limit):

Procedural Audits

Q56: Does your agency perform procedural audits of local assessment procedures/practices?

- Yes
- No

Q57: If your agency performs a procedural audit of local assessment procedures/practices—which categories of real property are audited? (check all that apply)

- Residential
- Commercial/Industrial
- Agricultural
- Timberland
- Not applicable
- Other, explain (240 char limit):

Q58: If your agency performs a procedural audit of local assessment procedures/practices—is the audit used INSTEAD OF a ratio study?

- Yes
- No
- Not applicable
- Additional comments (240 char limit):

Q59: If your agency performs a procedural audit, how is it used?

- To order adjustments to locally determined assessed values
- To order local jurisdictions to reappraise
- To advise provincial, state, or local jurisdictions of deficiencies or to recommend improvements in assessment procedures
- To approve tax assessment roll
- Not applicable
- Other, describe (240 char limit):

Miscellaneous/New and Emerging Issues

Q60: Can any of the following initiate legal action as a result of your ratio study?

- Taxing jurisdiction (e.g., school district)
- Taxpayers
- Not applicable

Q61: What software does your agency use for ratio studies? (check all that apply)

- Custom software written in-house
- CAMA vendor application
- Spreadsheet software (e.g., Excel)
- Statistical software (e.g. SPSS, NCSS, SAS)
- Database software (e.g., Access)
- Not applicable
- Additional comments (240 char limit):

Q62: Do you currently use any foreclosure-related sales in your ratio studies?

- Yes
- No
- Not applicable
- If yes, describe criteria (400 char limit):

Q63: Please provide comments about new issues or recent changes related to your ratio study practices (400 char limit):

Q64: Please share any comments you may have about this survey (400 char limit):

Appendix B. Tabulation of comparable responses from the surveys of ratio study practices in the United States and Canada, 1994–2013

1994 Q.No.	1997 Q.No.	2003 Q.No.	2008 Q.No.	2011 Q.No.	2013 Q.No.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
General																			
2	2	2	3	3	3	Frequency of ratio studies	Annual	35	41	41	44	43	44	1	6	8	8	7	7
							1 per 2 years	5	4	2	2	3	3	0	0	0	0	0	1
							1 per 3 years	1	0	0	1	2	1	1	1	1	1	1	1
							1 per 4 years	5	7	1	1	1	0	5	4	2	2	1	0
							Other	5	7	7	3	2	3	0	1	1	0	0	1
3	3	3	4	4	4	Who does study?	State or province/ territory	26	29	38	44	43	42	6	3	7	10	9	9
							Local only	4	7	7	7	6	7	0	3	1	0	0	1
							Contracted to others	14	14	4	2	1	2	1	4	2	1	0	1
							Both state and local	NA	NA	NA	11	6	5	NA	NA	NA	0	0	2
							Other	2	2	2	0	1	0	0	1	3	0	0	3
4	4	4	5	8	7	What does study include?	Sales only	20	23	25	31	30	28	5	8	8	10	8	10
							Appraisals only	5	4	2	1	1	1	0	0	1	0	0	0
							Both sales and appraisals	21	25	24	19	19	21	2	3	1	1	1	0
4a	4a	4a	6	9	8	If both, combined?	Yes	NA	NA	24	17	18	17	NA	NA	0	1	1	0
NA	NA	NA	NA	79	62	Foreclosure sales included?	Yes	NA	NA	NA	NA	17	18	NA	NA	NA	NA	1	0
4b	4b	4b	7	15	11	Who selects samples?	State or province/ territory	NA	NA	35	23	28	29	NA	NA	6	7	6	7
							Local	NA	NA	14	12	11	10	NA	NA	5	2	3	2
							Both	NA	NA	NA	16	10	9	NA	NA	NA	0	0	0
							Private contractor	NA	NA	NA	1	0	1	NA	NA	NA	1	0	1
4c	4c	4c	8	16	12	Who validates sales?	State or province/ territory	NA	NA	23	26	13	12	NA	NA	7	6	5	5
							Local	NA	NA	24	26	18	18	NA	NA	3	4	4	3
							Both	NA	NA	NA	8	17	18	NA	NA	0	1	0	0
							Contracted and other	NA	NA	NA	1	1	1	NA	NA	0	2	0	2
NA	NA	NA	9	18	13	Audit of sales validation?	Yes	NA	NA	NA	23	18	15	NA	NA	NA	3	2	3
NA	NA	NA	NA	11a	10	Time period sales are used?	One year	NA	NA	NA	NA	29	30	NA	NA	NA	NA	3	2
							Multiple years	NA	NA	NA	NA	17	17	NA	NA	NA	NA	5	2
							Varies by jurisdiction or class	NA	NA	NA	NA	10	5	NA	NA	NA	NA	0	1
NA	NA	NA	NA	11b	10	Time period described in relation to assessment date?	Before	NA	NA	NA	NA	23	20	NA	NA	NA	NA	7	6
							After	NA	NA	NA	NA	11	6	NA	NA	NA	NA	0	0
							Overlapping	NA	NA	NA	NA	9	5	NA	NA	NA	NA	4	3

Key to cell shading is located on page 69.

Appendix B. Tabulation of comparable responses (continued)

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Personal Property																			
5	5	5	93	NA	NA	Personal property (PP) taxable?	Yes	37	40	40	39	NA	NA	3	6	3	2	NA	NA
5a	5a	5a	94	69	54	PP ratio study conducted?	Yes	8	8	7	6	6	6	0	0	0	0	0	0
5b	5b	5b	95	NA	NA	For PP ratio study, do you use sales, appraisals, or both?	Sales only	0	0	0	0	NA	NA	0	0	0	0	NA	NA
							Appraisals only	7	8	7	6	NA	NA	0	0	0	0	NA	NA
							Both sales and appraisals	1	0	0	0	NA	NA	0	0	0	0	NA	NA
5c	5c	5d	99	71	55	How is PP ratio study used?	Order adjustments	NA	NA	3	2	2	3	NA	NA	NA	NA	NA	NA
							Equalize funding	NA	NA	0	3	3	3	NA	NA	NA	NA	NA	NA
							Order reappraisal	NA	NA	0	1	2	2	NA	NA	NA	NA	NA	NA
							Advise local jurisdictions	NA	NA	0	3	3	3	NA	NA	NA	NA	NA	NA
							Assist mass appraisal	NA	NA	0	1	1	2	NA	NA	NA	NA	NA	NA
							Adjust or equalize centrally assessed property	NA	NA	2	1	1	1	NA	NA	NA	NA	NA	NA
							Approve tax roll	NA	NA	0	0	0	0	NA	NA	NA	NA	NA	NA
NA	NA	5e	97	NA	NA	PP appraisal techniques?	Depreciation or economic life tables	NA	NA	7	4	NA	NA	NA	NA	NA	NA	NA	NA
							Iowa curves	NA	NA	2	1	NA	NA	NA	NA	NA	NA	NA	NA
							Other	NA	NA	1	1	NA	NA	NA	NA	NA	NA	NA	NA
8	6	6a	100	NA	NA	Statutory exemption for intangible personal property?	Yes	25	32	37	40	NA	NA	3	4	6	3	NA	NA
							No	17	15	9	12	NA	NA	4	4	6	8	NA	NA
NA	NA	6b	101	NA	NA	Exemptions for types of intangible personal property?	Capital stock	NA	NA	32	33	NA	NA	NA	NA	3	1	NA	NA
							Bonds	NA	NA	33	31	NA	NA	NA	NA	3	1	NA	NA
							Deposits	NA	NA	33	30	NA	NA	NA	NA	3	1	NA	NA
							Contracts and contract rights	NA	NA	34	30	NA	NA	NA	NA	3	1	NA	NA
							Copyrights	NA	NA	35	31	NA	NA	NA	NA	3	1	NA	NA
							Custom computer programs	NA	NA	29	30	NA	NA	NA	NA	3	1	NA	NA
							Customer lists	NA	NA	34	29	NA	NA	NA	NA	3	1	NA	NA
							Goodwill	NA	NA	30	28	NA	NA	NA	NA	3	1	NA	NA
							Licenses	NA	NA	34	30	NA	NA	NA	NA	3	1	NA	NA
							Patents	NA	NA	35	31	NA	NA	NA	NA	3	1	NA	NA
							Rights-of-way	NA	NA	22	20	NA	NA	NA	NA	2	1	NA	NA
							Trademarks	NA	NA	35	31	NA	NA	NA	NA	3	1	NA	NA
							Trade secrets	NA	NA	35	29	NA	NA	NA	NA	3	1	NA	NA
Other	NA	NA	6	2	NA	NA	NA	NA	1	0	NA	NA							

Key to cell shading is located on page 69.

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Procedural Audits																			
6	7	7	12	74	58	Procedural audit in lieu of ratio study?	Yes	19	17	22	2	2	2	2	3	3	1	0	0
							No	NA	NA	NA	30	25	35	NA	NA	NA	5	9	7
NA	7a	NA	11	72	56	Procedural audit on any category?	Yes	NA	NA	NA	32	25	26	NA	NA	NA	6	8	7
							No	NA	NA	NA	19	26	23	NA	NA	NA	5	1	3
NA	NA	NA	NA	73	57	Residential	Yes	NA	NA	NA	NA	26	22	NA	NA	NA	NA	7	7
						Commercial/Industrial	Yes	NA	NA	NA	NA	25	22	NA	NA	NA	NA	8	7
						Agricultural	Yes	NA	NA	NA	NA	21	20	NA	NA	NA	NA	5	6
						Timber	Yes	NA	NA	NA	NA	9	8	NA	NA	NA	NA	2	2
NA	NA	NA	14	75	59	Is procedural audit advisory?	Yes	NA	NA	NA	14	26	22	NA	NA	NA	4	5	6
						No	NA	NA	NA	17	25	NA	NA	NA	NA	1	4	NA	
NA	7c	7b	13	NA	NA	Is procedural audit in addition to ratio studies?	Yes	NA	25	26	26	NA	NA	NA	4	5	4	NA	NA
						No	NA	NA	NA	5	NA	NA	NA	NA	NA	2	NA	NA	
NA	7b	7c	15	75	59	Can equalization or reappraisal be ordered from audits?	Yes	11	14	15	12	8	4	2	5	4	4	1	2
						No	NA	NA	NA	16	17	NA	NA	NA	NA	2	8	NA	
Disclosure																			
7	8a	8a	16	20	14	Legal requirement?	Yes	30	35	37	36	37	37	6	9	11	11	10	9
7a	8a	8a	16	20	14	Disclosure made to:	State or province/territory only	NA	NA	2	6	6	6	NA	NA	11	7	8	7
						Local assessors only	NA	NA	8	8	8	7	NA	NA	2	2	0	0	
						Both	NA	NA	20	22	23	24	NA	NA	5	2	1	2	
0	0	8b	17	NA	NA	Disclosure occurs when?	At deed recording	NA	NA	35	33	NA	NA	NA	NA	11	11	NA	NA
						Within statutory time period	NA	NA	4	1	NA	NA	NA	NA	0	0	NA	NA	
						Other	NA	NA	3	2	NA	NA	NA	NA	0	0	NA	NA	
NA	NA	8c	18	23	NA	Are documents tracked?	Yes	NA	NA	31	29	24	NA	NA	NA	8	11	9	NA
NA	NA	8d	20	21	NA	Type of disclosure document?	Sale price statement	NA	NA	17	10	9	NA	NA	NA	10	5	3	NA
						Comprehensive questionnaire	NA	NA	7	10	7	NA	NA	NA	0	0	0	NA	
						Both	NA	NA	7	9	7	NA	NA	NA	1	3	1	NA	
						Other	NA	NA	8	7	15	NA	NA	NA	0	3	5	NA	
7a	8a	8e	22	24	15	Is disclosure confidential?	Yes	9	6	5	9	7	9	3	4	4	2	1	0
						No	NA	NA	39	29	35	37	4	7	8	9	8	10	
7b	8b	8f	23	26	16	Value-related fee?	Yes	NA	NA	34	35	36	36	5	10	10	11	9	9
7c	8c	8g	24	27	17	Mandatory recordation?	Yes	28	25	26	27	28	32	5	8	10	10	9	10
NA	NA	8g	24	22	NA	If yes, recordation occurs at what jurisdictional level?	State or province/territory	NA	NA	10	NA	1	NA	NA	NA	6	NA	0	NA
						Local	NA	NA	14	NA	35	NA	NA	NA	1	NA	9	NA	
						Both	NA	NA	3	NA	1	NA	NA	NA	0	NA	0	NA	
NA	NA	8h	NA	NA	NA	Legal penalties for falsifying?	Yes	NA	NA	35	NA	NA	NA	NA	NA	9	NA	NA	NA
						No	NA	NA	8	NA	NA	NA	NA	NA	2	NA	NA	NA	
						No element of disclosure?		3	4	2	7	5	5	0	0	0	0	0	0

Appendix B. Tabulation of comparable responses (continued)

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES					CANADA						
								Numbers of Responses					Numbers of Responses						
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Sales Price Adjustments																			
9	9	9	26	30	19	Verified sales prices adjusted?	Yes	33	34	32	40	39	35	6	9	9	8	7	7
						Adjust for:	Time	14	15	18	21	23	23	4	9	4	6	5	6
							Financing	16	16	15	11	12	10	3	8	5	4	2	4
							Personal property (chattel)	31	32	26	30	27	25	6	9	4	7	5	6
							Closing costs	0	5	2	6	8	8	0	1	1	1	1	2
							Brokerage fees	1	4	0	2	4	6	0	0	1	1	0	1
							Intangibles	5	11	11	16	14	13	3	1	3	3	3	4
							Other	7	4	4	4	3	4	0	2	3	0	1	2
10	10	10	27	31	21	Blanket or global adjustments?	Yes	8	3	3	3	3	2	1	0	0	0	0	0
NA	NA	NA	NA	30	20	Method of calculating time adjustments?	Tracking trends in ratios over time	NA	NA	NA	NA	15	21	NA	NA	NA	NA	5	5
							Tracking changes in value per unit	NA	NA	NA	NA	8	11	NA	NA	NA	NA	1	1
							Analysis of repeat sales	NA	NA	NA	NA	15	12	NA	NA	NA	NA	2	3
							MRA	NA	NA	NA	NA	2	1	NA	NA	NA	NA	1	0
10b	10b	10b	29	NA	NA	Court cases re: adjustments?	Yes	NA	NA	1	1	NA	NA	NA	NA	0	0	NA	NA
Purposes of Ratio Study																			
11	11	11	30	5, 6	5	Purposes of ratio study?	Order adjustments	22	27	26	20	20	20	3	4	2	1	1	3
							Equalize funding	30	31	31	28	29	26	1	3	2	2	2	1
							Order reappraisal	22	31	30	28	20	21	2	1	1	0	2	2
							Advise local jurisdictions	35	35	43	39	40	35	7	9	5	7	6	6
							Assist mass appraisal	NA	NA	31	22	20	19	NA	NA	9	4	6	7
							Adjust or equalize centrally assessed property	13	18	19	17	8	8	0	0	0	0	0	0
							Approve tax roll	0	0	5	13	13	9	0	0	3	3	2	2
NA	NA	NA	32	50	37	How many states issued orders to adjust?	Orders to adjust	NA	NA	NA	16	14	7	NA	NA	NA	0	0	0
NA	NA	NA	33	52	39	How many states issued orders to reappraise?	Orders to reappraise	NA	NA	NA	20	10	7	NA	NA	NA	0	0	0
NA	NA	NA	NA	63	NA	Fewer ratio study related actions taken in the past 3 years?	Yes	NA	NA	NA	NA	12	NA	NA	NA	NA	0	NA	
12	12	12	34	49	36	Adjustment procedures?	Order trend by class/category	11	14	13	16	15	15	1	2	1	0	1	1
							Trend jurisdiction-wide	5	3	3	7	3	2	1	1	0	0	0	0
							Grace period	2	12	3	12	25	10	0	2	1	0	0	0
							Other	11	4	10	12	16	14	6	3	0	0	0	2

Key to cell shading is located on page 69.

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA						
								Numbers of Responses						Numbers of Responses						
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013	
Testing Uniformity																				
13a	13a	13a	48	57	44	Statute/standard for COD/ COV?	Yes	32	34	38	40	31	33	2	8	9	8	6	5	
							No	18	17	13	12	20	18	2	3	3	3	3	5	
NA	NA	13a	48	57	44	Comparison to IAAO standard	IAAO standard	NA	NA	23	23	26	29	NA	NA	5	6	6	5	
							More stringent	6	1	5	6	5	0	1	1	4	2	0	0	
							Less stringent	21	23	21	11	3	4	3	6	3	0	0	0	
							Unknown	0	0	0	0	1	0	0	0	0	0	0	0	
13b	13b	13b	55, 57	58	44	Price-related bias—PRD standard?	Yes	11	18	22	27	28	30	2	4	6	6	6	6	
							No	35	34	28	25	23	21	4	7	6	5	3	4	
							IAAO standard 0.98–1.03	8	12	17	23	25	25	2	2	5	5	6	6	
NA	NA	NA	NA	NA	46	Price-related bias—PRB standard?	Yes	NA	NA	NA	NA	NA	2	NA	NA	NA	NA	NA	1	
							No	NA	NA	NA	NA	NA	36	NA	NA	NA	NA	NA	6	
							IAAO Standard	NA	NA	NA	NA	NA	2	NA	NA	NA	NA	NA	1	
13c	13c	13c	58, 59, 60	56, 59	47	Initiate action re: uniformity?	Yes	30	34	34	30	32	31	4	7	7	5	5	4	
							If so, which actions?	Order reappraisal	NA	NA	23	23	21	22	NA	NA	4	3	4	3
							Withhold funding	NA	NA	9	5	7	9	NA	NA	0	0	0	0	
							Other action	NA	NA	10	11	13	14	NA	NA	3	1	1	4	
NA	NA	13d	61	56, 41	43, 29	If yes, uniformity measures?	COD	NA	NA	24	21	22	22	NA	NA	4	5	6	4	
							PRD	NA	NA	12	14	14	9	NA	NA	2	4	4	4	
NA	NA	13e	62	43, 61	48	Action dependent upon:	Point estimates	NA	NA	17	12	11	12	NA	NA	4	2	1	2	
							Confidence intervals	NA	NA	8	11	6	10	NA	NA	0	1	4	0	
Testing Assessment Level																				
14a	14a	14a	35	54	41	Allowable variance?	Yes	33	34	34	37	41	43	5	7	5	8	8	10	
							No or unknown	13	18	17	15	10	8	2	4	7	3	1	0	
						Variance permitted?	± 10%	11	15	16	16	19	21	1	4	1	3	3	6	
							± 5%	5	6	6	4	5	5	2	2	2	2	3	2	
							Other	17	17	9	17	17	13	2	1	1	2	2	2	
14b	14b	14b	36	55	42	If yes, variance set by statute?	Yes	15	18	19	18	22	21	0	1	3	2	4	2	
							No	17	15	18	18	21	22	3	3	2	6	5	6	
						If no, legal authority?	Administrative rule	NA	NA	8	7	19	22	NA	NA	1	0	3	6	
							Other	NA	NA	7	11	0	6	NA	NA	0	5	2	2	

Appendix B. Tabulation of comparable responses (continued)

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES					CANADA						
								Numbers of Responses					Numbers of Responses						
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
14e	14d	14d	39	34	24	Do you calculate these measures of assessment level?	Arithmetic mean	32	39	36	32	35	33	5	8	8	5	4	3
							Median	38	43	38	39	38	44	6	10	9	8	8	8
							Weighted (aggregate) mean	35	40	39	32	24	29	4	6	7	3	4	3
							Geometric mean	4	2	5	6	4	3	0	2	1	0	1	1
							Other	4	1	2	6	6	6	0	0	0	1	0	0
						Do you use these measures for direct equalization?	Arithmetic mean	NA	NA	NA	9	3	2	NA	NA	NA	1	0	0
							Median	NA	NA	NA	25	18	17	NA	NA	NA	0	1	1
							Weighted (aggregate) mean	NA	NA	NA	10	5	4	NA	NA	NA	0	0	0
							Geometric mean	NA	NA	NA	1	0	0	NA	NA	NA	0	0	0
							Other	NA	NA	NA	1	1	2	NA	NA	NA	0	0	0
						Do you use these measures for indirect equalization?	Arithmetic mean	NA	NA	NA	9	7	9	NA	NA	NA	1	0	0
							Median	NA	NA	NA	12	17	14	NA	NA	NA	1	0	1
							Weighted (aggregate) mean	NA	NA	NA	15	15	14	NA	NA	NA	0	0	0
							Geometric mean	NA	NA	NA	2	0	0	NA	NA	NA	0	0	0
							Other	NA	NA	NA	1	1	1	NA	NA	NA	0	0	0
NA	14e	14e	40	35	25	Test for statistical normality?	Yes	NA	13	13	16	22	27	NA	4	4	5	5	5
15	16	16	63	NA	NA	Residential property appraised annually at 100% of current fair market value?	Yes	17	22	23	32	NA	NA	6	6	8	4	NA	NA
15a	16a	16a	64, 65	NA	NA	Property appraised as of a constant base year?	Yes	5	13	13	10	NA	NA	2	5	5	6	NA	NA
NA	16b	16a	64	NA	NA	Are property values updated during an interim year?	Yes	NA	18	14	6	NA	NA	NA	5	5	3	NA	NA
NA	NA	NA	NA	53	40	Statutorily set level of assessment?	Yes	NA	NA	NA	NA	43	43	NA	NA	NA	NA	5	3
NA	NA	16b	68	NA	NA	Can local jurisdictions establish different assessment ratios?	Yes	NA	NA	10	16	NA	NA	NA	NA	0	0	NA	NA
15b	16c	16c	70-76	NA	NA	Statutorily set ratios at 100% of full market value?	Residential	NA	NA	23	27	NA	NA	NA	NA	8	9	NA	NA
							Farmland	NA	NA	12	4	NA	NA	NA	NA	7	4	NA	NA
							Commercial	NA	NA	30	28	NA	NA	NA	NA	10	9	NA	NA
							Industrial	NA	NA	30	28	NA	NA	NA	NA	10	9	NA	NA
							Utilities	NA	NA	29	30	NA	NA	NA	NA	5	9	NA	NA
							Personal property	NA	NA	18	20	NA	NA	NA	NA	0	1	NA	NA
							Railroads	NA	NA	23	28	NA	NA	NA	NA	3	2	NA	NA

Key to cell shading is located on page 69.

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Testing Reliability																			
NA	NA	15a	37	36	26	Use confidence interval (CI) to determine statistical compliance?	Yes	NA	NA	19	15	14	17	NA	NA	4	5	3	3
							No	NA	NA	27	32	33	31	NA	NA	6	3	6	6
15d	15a	15a	43	36	26	Is compliance based upon?	Point estimates only	NA	26	19	27	30	27	NA	5	3	2	2	7
							Confidence intervals only	13	18	20	6	14	17	NA	1	6	3	3	2
							Both	NA	NA	NA	11	NA	NA	NA	NA	NA	2	NA	NA
NA	NA	15b	NA	NA	NA	If yes, which test?	95% confidence level	NA	NA	17	NA	NA	NA	NA	NA	4	NA	NA	NA
							90% confidence level	NA	NA	5	NA	NA	NA	NA	NA	2	NA	NA	NA
							Other confidence level	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA
14d	15b	15c	44	37	27	Is a sample mean ratio of 86%, with a CI between 76% and 95%, in compliance?	Yes, confidence interval overlaps	NA	11	13	11	12	11	NA	NA	2	4	3	1
							No, only point estimates used	NA	NA	28	30	29	29	NA	1	5	2	0	8
							No, CI fails to overlap 100%	NA	NA	NA	5	2	5	NA	NA	NA	1	0	2
NA	NA	NA	45	39	28	If CI overlaps, but the median continues to be out of compliance for several years, what actions?	Lower confidence level and reevaluate	NA	NA	NA	3	2	2	NA	NA	NA	2	1	1
							Base compliance decision on point estimates	NA	NA	NA	0	2	2	NA	NA	NA	0	0	0
							Continue to find in compliance	NA	NA	NA	6	6	6	NA	NA	NA	2	1	0
							Other	NA	NA	NA	6	4	3	NA	NA	NA	2	0	0
NA	15c	15d	47	NA	NA	Revise if COD showed poor uniformity?	No change	NA	33	16	7	NA	NA	NA	1	0	2	NA	NA
							May lower level of confidence	NA	NA	2	3	NA	NA	NA	NA	0	1	NA	NA
							May use point estimate only	NA	NA	3	20	NA	NA	NA	NA	0	1	NA	NA
							May review level measures	NA	NA	7	10	NA	NA	NA	NA	0	5	NA	NA
							May use additional information	NA	NA	16	17	NA	NA	NA	NA	0	5	NA	NA
NA	NA	NA	NA	43	31	Compute confidence intervals for?	COD	NA	NA	NA	NA	20	21	NA	NA	NA	NA	6	5
							PRD	NA	NA	NA	NA	9	7	NA	NA	NA	NA	4	3
NA	NA	NA	62	61	48	Uniformity compliance actions dependent on?	Confidence intervals	NA	NA	NA	9	6	10	NA	NA	NA	3	4	0

Appendix B. Tabulation of comparable responses (continued)

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Ratio Study Samples																			
NA	17a	17a	NA	NA	NA	Stratification	Range of values	NA	11	18	NA	NA	NA	NA	NA	4	NA	NA	NA
							Geographic neighborhood	NA	20	16	NA	NA	NA	NA	NA	9	NA	NA	NA
							School district	NA	4	8	NA	NA	NA	NA	NA	1	NA	NA	NA
							City (Municipality)	NA	1	12	NA	NA	NA	NA	NA	4	NA	NA	NA
							County	NA	NA	25	NA	NA	NA	NA	NA	2	NA	NA	NA
							Other factors	NA	NA	12	NA	NA	NA	NA	NA	4	NA	NA	NA
16a	17b	17b	80	32	22	Smallest sample	Less than 5	4	8	7	10	13	11	1	2	3	1	1	2
							5 to 9	7	8	10	10	11	8	2	1	1	2	2	1
							10 to 19	3	4	10	6	4	7	2	1	3	2	2	1
							20 to 30	9	13	5	7	8	5	0	3	1	2	2	1
							Greater than 30	4	3	10	5	4	4	0	1	2	0	0	0
							Other	19	16	9	10	10	10	2	3	1	2	2	4
NA	17c	17c	81	33	23	Sample size quotas or goals?	Yes	12	11	20	13	16	15	0	2	1	1	2	2
NA	17d	17d	83	45	33	Do you identify/trim outlier ratios?	Yes	NA	26	35	34	35	36	NA	6	9	7	8	8
NA	NA	NA	84	46	34	Method of outlier identification?	1.5 × interquartile range	NA	NA	NA	5	7	9	NA	NA	NA	2	2	4
							3.0 × interquartile range	NA	NA	NA	4	8	6	NA	NA	NA	1	2	2
							Beyond 2 standard deviations	NA	NA	NA	6	3	3	NA	NA	NA	2	2	1
							Fixed symmetric pts. <.5 or >1.5	NA	NA	NA	4	8	7	NA	NA	NA	1	3	1
							Fixed symmetric pts. <.3 or >2.0	NA	NA	NA	6	1	5	NA	NA	NA	1	0	0
							Good judgment	NA	NA	NA	10	8	8	NA	NA	NA	5	3	2
							Logical break points	NA	NA	NA	NA	4	6	NA	NA	NA	NA	2	1
NA	17f	17f	86	13	NA	Determine representativeness?	Yes	NA	21	32	21	26	NA	NA	4	5	4	4	NA
NA	17a	NA	NA	NA	NA	If yes, which apply?	Stratify by geographic area	NA	21	21	NA	NA	NA	NA	7	4	NA	NA	NA
							Stratify by property class	NA	Most	29	NA	NA	NA	NA	5	4	NA	NA	NA
							Stratify by value range	NA	11	16	NA	NA	NA	NA	5	3	NA	NA	NA
							Other	NA	NA	6	NA	NA	NA	NA	NA	2	NA	NA	NA
NA	NA	17g	87	46	34	Fixed trim points remove outliers?	Yes	NA	NA	16	9	9	12	NA	NA	3	2	3	1
NA	NA	17h	85	47	35	Limit on trimmed sales?	Yes	NA	NA	10	5	6	8	NA	NA	3	0	1	1

Key to cell shading is located on page 69.

1994 QNo.	1997 QNo.	2003 QNo.	2008 QNo.	2011 QNo.	2013 QNo.	Topic	Response	UNITED STATES						CANADA					
								Numbers of Responses						Numbers of Responses					
								1994	1997	2003	2008	2011	2013	1994	1997	2003	2008	2011	2013
Sales Chasing																			
NA	NA	18	88	64	50	Statutes for sales chasing?	No, but nonstatutory requirement	NA	NA	NA	12	9	11	NA	NA	NA	0	1	3
							Yes	NA	NA	10	3	5	3	NA	NA	1	0	0	0
NA	NA	NA	54	68	53	Lower limit on COD established	Yes	NA	NA	NA	1	6	8	NA	NA	NA	0	2	3
NA	NA	NA	89	65	51	Test for sales chasing?	Yes	NA	NA	NA	27	31	30	NA	NA	NA	5	5	6
NA	NA	NA	90	66	52	Procedure for sales chasing?	Compare average changes—sold vs. unsold	NA	NA	NA	20	24	20	NA	NA	NA	3	5	5
					Compare average unit values		NA	NA	NA	6	3	4	NA	NA	NA	3	5	2	
					Split sample technique		NA	NA	NA	5	8	11	NA	NA	NA	3	1	0	
					Compare observed vs. expected distributions		NA	NA	NA	14	7	8	NA	NA	NA	4	1	2	
					Mass appraisal techniques		NA	NA	NA	17	7	6	NA	NA	NA	3	1	1	
Miscellaneous																			
NA	NA	NA	NA	44	32	Compute statewide ratio study statistics?	Yes	NA	NA	NA	NA	29	30	NA	NA	NA	NA	6	6
NA	NA	NA	NA	NA	32b	How is statewide ratio study made available?	Website	NA	NA	NA	NA	NA	23	NA	NA	NA	NA	NA	4
					Publication		NA	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	3	
					None		NA	NA	NA	NA	NA	2	NA	NA	NA	NA	NA	2	
					Hard copy		NA	NA	NA	NA	NA	2	NA	NA	NA	NA	NA	0	
NA	NA	NA	NA	77	61	Software used for ratio studies?	Custom, written in-house	NA	NA	NA	NA	23	22	NA	NA	NA	NA	4	5
					CAMA vendor application		NA	NA	NA	NA	6	8	NA	NA	NA	NA	1	1	
					Spreadsheet (e.g., Excel)		NA	NA	NA	NA	25	23	NA	NA	NA	NA	6	5	
					Statistical (e.g., SPSS)		NA	NA	NA	NA	19	18	NA	NA	NA	NA	7	7	
					Database (e.g., Access)		NA	NA	NA	NA	14	12	NA	NA	NA	NA	4	3	
NA	NA	NA	42	7	6	Incorporate IAAO standards in statutes or rules?	Yes	NA	NA	NA	33	36	38	NA	NA	NA	5	5	5
					No		NA	NA	NA	16	15	13	NA	NA	NA	6	4	5	
17	19	19	92	76	60	Legal action re: ratio study?	Yes	30	32	37	27	20	21	1	4	3	1	1	2
NA	NA	NA	NA	76	60	Legal action by taxpayer?	Yes	NA	NA	NA	NA	12	11	NA	NA	NA	NA	0	1
NA	NA	NA	NA	76	60	Legal action by taxing jurisdiction?	Yes	NA	NA	NA	NA	18	19	NA	NA	NA	NA	1	2
Legend																			
NA	= not asked or compiled																		
	= These questions are new to the 2013 survey.																		
	= These questions were not asked beginning with the 2013 survey.																		

Appendix C. Results of 2013 Survey of Ratio Study Practices in the United States

Question No. >		Q2	Q3	Q4	
State	Abbreviation	What is your jurisdiction type?	How often does your jurisdiction conduct ratio studies?	Who conducts the state ratio study?	Other
Alabama	AL	State agency	Annual	State/local	DE: No one OR: 36 county assessors
Alaska	AK	State agency	Annual	Local only	
Arizona	AZ	State agency	Annual	State	
Arkansas	AR	State agency	Annual	State	
California	CA	State agency	Periodically	State	
Colorado	CO	State agency	Annual	Contractor	
Connecticut	CT	State agency	Annual	State	
Delaware-Kent County	DE	Local	Not required	n/a	
District of Columbia	DC	Combination state and local	Annual	Local only	
Florida	FL	State agency	Annual	State	
Georgia	GA	State agency	Annual	State	
Hawaii-Honolulu County	HN	Local	Annual	Local only	
Idaho	ID	State agency	Annual	State	
Illinois	IL	State agency	Annual	State	
Indiana	IN	State agency	Annual	Local only	
Iowa	IA	State agency	Annual	State	
Kansas	KS	State agency	Annual	State	
Kentucky	KY	State agency	Annual	State	
Louisiana	LA	State agency	Annual	State	
Maine	ME	State agency	Annual	State	
Maryland	MD	State agency	Annual	State	
Massachusetts	MA	State agency	Annual	Local/contractor	
Michigan	MI	State agency	Annual	Local only	
Minnesota	MN	State agency	Annual	State	
Mississippi	MS	State agency	Annual	State	
Missouri	MO	State agency	Biennially	State	
Montana	MT	State agency	Biennially	State	
Nebraska	NE	State agency	Annual	State/local	
Nevada	NV	State agency	Annual	State	
New Hampshire	NH	State agency	Annual	State	
New Jersey	NJ	State agency	Annual	State	
New Mexico	NM	State agency	Annual	State	
New York	NY	State agency	Annual	State	
North Carolina	NC	State agency	Annual	State	
North Dakota	ND	State agency	Not required	State/local	
Ohio	OH	State agency	Once every 3 years for each county	State	
Oklahoma	OK	State agency	Annual	State	
Oregon	OR	State agency	Annual	Local	
Pennsylvania	PA	State agency	Annual	State	
Rhode Island	RI	Local answering for state	Annual	State	
South Carolina	SC	State agency	Annual	State	
South Dakota	SD	State agency	Annual	State	
Tennessee	TN	State agency	Every 2 years	State	
Texas	TX	State agency	Annual	State	
Utah	UT	State agency	Annual	State/local	
Vermont	VT	State agency	Annual	State	
Virginia	VA	State agency	Annual	State	
Washington	WA	State agency	Annual	State	
West Virginia	WV	State agency	Annual	State	
Wisconsin	WI	State agency	Annual	State	
Wyoming	WY	State agency	Annual	State/local	

Note: n/a = not applicable

Question No. >	Q5							
State	How is the state ratio study used?							Other
	To order adjustments to locally determined assessed values if necessary	To equalize state funding of local jurisdictions	To order local jurisdictions to reappraise	To advise assessment officials of assessment conditions	To assist mass appraisal programs	To approve tax assessment roll	To adjust or equalize centrally determined assessed values (such as utilities)	
AL	X		X				X	CA: We do not conduct ratio studies per se. Instead, we periodically measure counties' overall assessment levels to determine their compliance with state law. IN: The local assessing officials are responsible for completing/ conducting annual adjustments, including a recommended ratio study. The Department of Local Government Finance (DLGF) uses the local information in the review and approval of the annual adjustment process. NJ: Tax appeals RI: The State does ratio studies as part of the State Aid to Municipalities. The State also pays a portion of the statistical revaluations done by the cities and towns every 3 and 6 years (full revaluation at 9 years paid by municipality). During the statistical revaluation, the state asks for the sales information to review the revaluation assessments. WI: Regarding ordering local jurisdictions to reappraise: state law requires major classes of property in each municipality to be within 10% of the full value of that same class once in a 7-year period. Ratio studies help determine that compliance.
AK		X						
AZ	X		X		X			
AR	X		X	X	X			
CA								
CO		X	X	X	X	X		
CT		X		X				
DE								
DC				X	X			
FL		X		X	X	X		
GA		X						
HN					X			
ID	X			X				
IL				X				
IN	X	X	X	X				
IA	X	X	X	X				
KS			X	X	X			
KY		X	X	X		X		
LA	X		X	X		X		
ME		X		X				
MD				X				
MA		X				X		
MI								
MN	X	X		X				
MS						X		
MO	X		X	X	X			
MT				X	X			
NE	X	X		X	X		X	
NV	X		X	X	X			
NH		X		X			X	
NJ	X	X	X	X	X			
NM				X	X			
NY		X						
NC							X	
ND	X			X				
OH	X		X	X	X	X		
OK	X	X	X	X	X			
OR	X			X	X			
PA		X		X				
RI		X						
SC				X		X		
SD	X	X	X					
TN	X	X	X	X	X		X	
TX		X						
UT	X		X	X			X	
VT		X	X					
VA		X		X				
WA		X		X			X	
WV			X	X	X			
WI		X	X	X			X	
WY	X	X	X	X	X	X		

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q6	Q7	Q8
State	Have you incorporated portions of the IAAO <i>Standard on Ratio Studies</i> in your statutes or rules and regulations?	Does the state real property ratio study include sales only, appraisals only, or both sales and appraisals conducted by or contracted by the state agency?	If the state agency uses both sales and appraisals, can they be combined in order to study one type or category of property?
AL	Yes	Sales only	Not applicable
AK	Yes	Sales only	Not applicable
AZ	Yes	Sales only	Not applicable
AR	Yes	Both sales and appraisals	Can be combined for Commercial/Industrial properties
CA	No	Appraisals	Not applicable
CO	Yes	Both sales and appraisals	Yes, when warranted
CT	No	Sales only	Not applicable
DE	No		
DC	Yes	Sales only	Not applicable
FL	Yes	Both sales and appraisals	Sales use a priority; appraisals as proxy when sales are not available or representativeness issues
GA	Yes	Both sales and appraisals	Sales are tested for accuracy and uniformity.
HN	No	Sales only	Not applicable
ID	Yes	Sales only	Not applicable
IL	Yes	Sales only	Not applicable
IN	Yes	Sales only	Not applicable
IA	Yes	Both sales and appraisals	Commercial realty
KS	Yes	Sales only	Not applicable
KY	Yes	Both sales and appraisals	We only use appraisals if a county has less than 20 valid residential sales.
LA	No	Both sales and appraisals	If there aren't enough sales, appraisals can be added.
ME	No	Both sales and appraisals	Up to 24 months—12 months pre-period, 12 months post
MD	Yes	Sales only	Not applicable
MA	Yes	Both sales and appraisals	For commercial/industrial properties where sales are limited
MI	No	Both sales and appraisals	No
MN	Yes	Both sales and appraisals	Yes
MS	Yes	Sales only	Not applicable
MO	No	Both sales and appraisals	Currently applies to residential only
MT	Yes	Sales only	Not applicable
NE	Yes	Sales only	
NV	Yes	Both sales and appraisals	No limitation
NH	Yes	Sales only	Not applicable
NJ	Yes	Sales only	Not applicable
NM	Yes	Sales only	Not applicable
NY	Yes	Both sales and appraisals	Appraisals are used to supplement where sales data are scarce.
NC	No	Sales only	Not applicable
ND	Yes	Both sales and appraisals	Appraisals used if required number of sales not available.
OH	Yes	Sales only	Not applicable
OK	No	Sales only	Not applicable
OR	Yes	Sales only	
PA	Yes	Sales only	
RI	Yes	Sales only	Not applicable
SC	No	Both sales and appraisals	Sales/app ratio study includes sales and appraisals submitted by each county not by state.
SD	Yes	Sales only	Not applicable
TN	Yes	Sales only	Not applicable
TX	Yes	Both sales and appraisals	Sales utilized first. If the sample size inadequate, appraisals are used to meet sample size requirement.
UT	Yes	Sales only	Not applicable
VT	Yes	Both sales and appraisals	Yes
VA	No	Sales only	No
WA	No	Both sales and appraisals	Appraisals added to study if too few sales available in particular stratum.
WV	Yes	Both sales and appraisals	Yes
WI	Yes	Both sales and appraisals	Randomly appraised nonsale properties are proxies for sale price. Assessments are compared to both sale properties and appraised properties to develop a class ratio.
WY	Yes	Sales only	Not applicable

Question No. >	Q9	Q10					
State	What was the assessment date tested with the state's most recent ratio study?	What is the time period from which sales are used in the state ratio study?					
		One year	Multiple years	Flexible time period (varies by jurisdiction or category)	Sale period mostly before assessment date	Sale period mostly after assessment date	Sale period equally before and after the assessment date
AL	10/01/2012	X					
AK	01/01/2013		X				
AZ	01/01/2014		X		X		
AR	01/01/2013	X	X	X	X		
CA	n/a						
CO	Assessment: 01/01/13; appraisal: 06/30/12		X				
CT	10/01/2011	X				X	
DE							
DC	01/01/2013		X		X		
FL	01/01/2012	X	X	X			
GA	January 1st					X	
HN	06/30/2012	X					
ID	01/01/2012	X		X		X	
IL	2009 assessment values for 2010 sales	X				X	
IN	03/01/2013	X			X		
IA	2012	X					
KS	2012	X	X				
KY	07/01/12-12/31/12				X		
LA	01/01/2011	X					X
ME	04/01/2012						X
MD	2012	X					X
MA	01/01/2012	X	X		X		
MI	01/01/2012	X	X		X		
MN	01/02/2014		X		X		
MS	01/01/2014			X			
MO	01/01/2011						X
MT	2008		X				
NE	01/01/2013		X		X		
NV	01/01/2014		X	X	X		
NH	04/01/2012	X					
NJ	10/01/2012	X					
NM	01/01/2013	X			X		
NY	07/01/2012						
NC	01/01/2013	X					
ND	02/01/2013	X	X		X		
OH		X			X		
OK	01/01/2012		X		X		
OR	01/01/2013	X			X		
PA							
RI	3 years prior; state study always 3 years behind	X					
SC	December 31 each year	X			X		
SD	10/31/2012		X		X		
TN	01/01/2014	X					
TX	January 1, 2013	X					X
UT	01/01/2013	X	X		X		
VT	2012		X			X	
VA	2011	X				X	
WA	01/01/2012				X		
WV	07/07/2012	X					
WI	01/01/2012	X	X				
WY	01/01/2013	X			X		

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q10 (continued)	Q11	Q12
State	Which of the following describes the time period from which sales are used in your ratio study? Additional comments	Which jurisdiction primarily performs the sales sample selection?	Which jurisdiction primarily conducts the sales validation (screening)?
AL	<p>AK: Municipalities with a small number of sales are encouraged to use multiple years sales data (trended).</p> <p>AR: Counties with < 50,000 parcels = 2 yrs sales for Residential & Vacant, 3 yrs sales for Commercial. Counties with 50,000+ parcels = 1 yr sales for Residential & Vacant, 2 yrs sales for Commercial</p> <p>CO: Initial data gathering period is 18 months. May go back in 6 month increments for up to 5 years.</p> <p>FL: Sales used before assessment date only. After used for informational purposes only.</p> <p>GA: New state legislation requires special treatment for prior year fair market value sales</p> <p>IN: For the March 1, 2013 assessment date, sales from calendar year 2012, and Jan. and Feb. 2013 were used. Sales outside that timeline may be used as long as they are time adjusted.</p> <p>KS: For residential and commercial subclasses with less than six valid sales, supplemental sales can be added from up to 4 years prior by statute.</p> <p>MA: The total of arm's-length sales should be at least 2% of the class (1 or 2 years used). If less than 10 sales, then 24 months of sales for that class should be analyzed.</p> <p>MN: 21 months for time trends</p> <p>MO: We use sales from 6 months before and after the assessment date, but will expand to 1 year before and after if sales are lacking.</p> <p>NH: Can use prior year's sales if insufficient sales available.</p> <p>NY: Time period used depends on latest year assessing jurisdiction reassessed throughout jurisdiction.</p> <p>ND: Current year plus 3 prior years are used to reach a sufficient number of sales.</p> <p>OH: In the current market, we've been using some supplemental ratio studies that use sales that took place after the lien date.</p> <p>OK: When adequate sample size available, 1 year used. Where additional samples are needed, additional years are used rather than producing appraisals.</p> <p>RI: Sales from the previous calendar years are used for the December 31 assessment date. They are time adjusted per quarter.</p> <p>SC: In a reassessment year, the ratio study is conducted and must meet minimum requirements before tax notices can be mailed to taxpayers</p> <p>TX: If unusual ratio distributions occur, the time period shifts to only after the assessment date.</p> <p>WA: Eight month period, August 1 of previous year through March 31 of current year. Beginning in 2014, time period will increase to 1 year (May 2 through April 30).</p> <p>WI: A sales study is done for each year of sales. Occasionally, when few sales exist in a municipality, up to 3 years of sales studies are combined to give an indicator of level of assessment.</p>	State	Local
AK		Local	Local
AZ		State	Both state and local
AR		State	Local
CA		Not applicable	Not applicable
CO		Contracted service provider	Other
CT		Both state and local	Both state and local
DE		Not applicable	
DC		Local	Local
FL		State	Local
GA		State	State agency
HN		Local	Local
ID		Both state and local	Local
IL		State	State agency
IN		Local	Both state and local
IA		State	State agency
KS		State	State agency
KY		State	State agency
LA		State	State agency
ME		State	Both state and local
MD		State	State agency
MA		Both state and local	Local
MI		Both state and local	Both state and local
MN		State	Both state and local
MS		Both state and local	Both state and local
MO		Both state and local	Local
MT		State	State agency
NE		Both state and local	Local
NV		State	Local
NH		State	State agency
NJ		State	Both state and local
NM		Local; assessors report transfers, code sales as valid or nonvalid.	Local
NY		State	Both state and local
NC		State	Local
ND		Local	Both state and local
OH		State	State agency
OK		State	Both state and local
OR		Local; each county performs sales sample selection.	Local
PA		State	Both state and local
RI		Local; cities and towns send the sales to the state each year.	Local
SC	Local	Local	
SD	State	Both state and local	
TN	State	Both state and local	
TX	State	State agency	
UT	State	Both state and local	
VT	State	Both state and local	
VA	Both state and local	Both state and local	
WA	State	State agency	
WV	State	Local	
WI	Both state and local	Both state and local	
WY	Local	Local	

Question No. >	Q12 (continued)	Q13
State	Which jurisdiction primarily conducts the sales validation (screening)? Other	If the state agency does NOT conduct the sales validation, does the agency perform an audit of the sales validation process? If yes, briefly summarize the audit policy.
AL	AR: Counties and/or their contractors if they contract out their reappraisals	n/a
AK		No
AZ	FL: State audits screening of local officials.	n/a
AR	IN: Local sales validation; state approves file (verifies data, name, address, parcel # included)	Yes
CA	ND: The local jurisdiction may challenge a sale, but state must approve the challenge.	n/a
CO	OR: Each county conducts sales validation.	n/a
CT	RI: Sales file created locally with field to code for reasons for invalid sale.	
DE		n/a
DC		Yes
FL	WI: 40% of sales rejected by state as not arm's length; 15% found invalid by municipal assessor	n/a
GA		n/a
HN		n/a
ID		No
IL		Yes
IN		No
IA		n/a
KS		n/a
KY		n/a
LA		n/a
ME		n/a
MD		n/a
MA		Yes
MI		Yes
MN		n/a
MS		n/a
MO		Yes
MT		n/a
NE		Yes
NV		Yes
NH		n/a
NJ		n/a
NM		Yes
NY		No
NC		Yes
ND		No
OH		n/a
OK		n/a
OR		No
PA		No
RI		Yes
SC		No
SD		
TN		n/a
TX		n/a
UT		Yes
VT		
VA		No
WA		Yes
WV		Yes
WI		Yes
WY		
		AL: During our every 4-year audit of municipalities, we do audit sales ratio studies. We also carefully screen sales ratios annually when municipalities give us their annual reports, which include a copy of the sales ratio.
		AZ: We select samples and determine if proper validation codes were assigned to the sales by checking with confirmation sources (i.e., buyer, seller, etc.).
		CO: An independent company (auditor/contracted service provider) is contracted to test the statistical compliance of values established by each county assessor's office. Contracted service provider performs the audit of the sales validation process as a part of its procedural review.
		MO: MO: forms, policies, and procedures of each jurisdiction for proper compliance with state regulations and IAAO standards.
		NM: Annual evaluations are conducted in all counties. Sales verification procedures are investigated during these evaluations.
		NC: The local counties select deeds from a random sample supplied by the state office. The county then submits the sale selected along with the appraised value. We (the state) perform an audit where we review a certain percentage of what was submitted. We confirm that the correct deed was selected and that the correct value was given. If we are satisfied with the results, then the county's work is accepted. There have been times when we (the state) have gone back and conducted the study completely on our own, as we were not satisfied with the deed selection, or the values given.
		RI: When reviewing the sales, if there are any that seem out of line, the state will contact the local assessor's office for some clarification.
		WA: Reviews validated and invalidated sales for reasonableness and appropriate use of invalidation codes. State selects specific invalidation codes to audit for accuracy and consistency.
		WI: The state does a review of those sales rejected for ratio purposes by the local assessor to determine if proper reject procedures were followed.

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q14	Q15	Q16
State	Does your jurisdiction have a law requiring disclosure of real estate sale prices to assessment officials?	Are disclosed sale prices public records?	Is a value-related fee charged (e.g., transfer tax, deed stamp) for real property transfers?
AL	No	Yes	Yes AL: Deed transfer tax is \$0.50 per \$500 and must be payable to the probate judge.
AK	No	No	No AZ: There is a recording fee.
AZ	Yes, disclosure made to local assessors	Yes	Yes AR: Revenue stamps are attached to the warranty deed, the amount paid for the property can be determined by the amount of stamps attached to deed (the current rate is \$3.30 per \$1,000 of consideration paid for the property).
AR	No	n/a	Yes CA: Generally, \$0.55 for each \$500 of value
CA	Yes, disclosure made to state officials	No	Yes CO: \$0.01 per \$100 of paid real property consideration (C.R.S. 39-13-102(2)(b)).
CO	Yes, disclosure made to local assessors	Yes	Yes GA: \$1/\$1000
CT	Yes, disclosure made to both	Yes	Yes IA: \$0.80 per \$500 with the first \$500 exempt
DE	Yes, disclosure made to both	Yes	Yes KY: The transfer tax rate is \$0.50 per \$500 of value or fraction thereof.
DC	Yes, disclosure made to local assessors	No	Yes ME: \$4.40/\$1000
FL	Yes, disclosure made to both	Yes	Yes MN: \$0.0035 state + \$0.0001 deed tax
GA	Yes, disclosure made to both	Yes	Yes NE: \$2.25 per \$1,000 of sale price unless expressly exempt by law
HN	Yes, disclosure made to state officials	Yes	Yes NV: (f) "Value" means: (1) In the case of any deed which is not a gift, or a land sale installment contract, the amount of the full purchase price paid or to be paid for the real property. (2) In the case of a gift, or any deed with nominal consideration or without stated consideration, the estimated fair market value of the property. 2. As used in paragraph (f) of subsection 1, "estimated fair market value" means the estimated price the real property would bring on the open market in a sale between a willing buyer and a willing seller. Such price may be derived from the assessor's taxable value or the prior purchase price, if the prior purchase was within the 5 years immediately preceding the date of valuation, whichever is higher. 1. A tax, at the rate of: (a) In a county whose population is 700,000 or more, \$1.25; and (b) In a county whose population is less than 700,000, 65 cents, for each \$500 of value or fraction thereof, is hereby imposed on each deed by which any lands, tenements or other realty is granted, assigned, transferred or otherwise conveyed to, or vested in, another person, or land sale installment contract, if the consideration or value of the interest or property conveyed exceeds \$100.
ID	No	n/a	No NY: Transfer stamp, currently charged at \$4 per \$1,000 of consideration.
IL	Yes, disclosure made to both	Yes	Yes OK: Documentary Tax Stamp Fee: \$1.50 per \$1,000 of sale price
IN	Yes, disclosure made to local assessors	Yes	No RI: There is an RI Real Estate Conveyance Tax which is \$4 for every \$1,000 of sale price.
IA	Yes, disclosure made to both	Yes	Yes TN: \$0.37 per \$100 of value
KS	Yes, disclosure made to both	No	No WA: Two flat fees: 5% technology fee and 5% administration fee for exempt sales; also excise tax, which is value related, but not a fee
KY	Yes, disclosure made to local assessors	Yes	Yes WI: 0.003 times sale price, applied to arm's-length sales
LA	No	Yes	No
ME	Yes, disclosure made to both	Yes	Yes
MD	Yes, disclosure made to both	Yes	Yes
MA	Yes, disclosure made to both	Yes	Yes
MI	Yes, disclosure made to both	Yes	Yes
MN	Yes, disclosure made to state officials	Yes	Yes
MS	No	No	No
MO	No	n/a	No
MT	Yes, disclosure made to state officials	No	No
NE	Yes, disclosure made to both	Yes	Yes
NV	No	Yes	Yes
NH	Yes, disclosure made to state officials	Yes	Yes
NJ	Yes, disclosure made to both	Yes	Yes
NM	Yes, disclosure made to local assessors	No	No
NY	Yes, disclosure made to both	Yes	Yes
NC	No	Yes	Yes
ND	Yes, disclosure made to both	Yes	No
OH	Yes, disclosure made to both	Yes	Yes
OK	No	n/a	Yes
OR	Yes, disclosure made to both	Yes	No
PA	Yes, disclosure made to both	Yes	Yes
RI	No	Yes	Yes
SC	Yes, disclosure made to local assessors	Yes	Yes
SD	Yes, disclosure made to state officials	Yes	Yes
TN	No	Yes	Yes
TX	No	No	No
UT	No	n/a	No
VT	Yes, disclosure made to both	Yes	Yes
VA	Yes, disclosure made to both	Yes	Yes
WA	Yes, disclosure made to both	Yes	Yes
WV	Yes, disclosure made to both	Yes	No
WI	Yes, disclosure made to both	Yes	Yes
WY	Yes, disclosure made to both	No	No

Question No. >	Q17	Q18								
State	Does your jurisdiction have a law making recordation/registration mandatory for real property transfers?	Which of the following adjustments to sale price do you have authority to implement in your ratio studies?								
		No authority to implement adjustments	Time	Financing	Personal property	Closing costs	Brokerage fees	Intangible personal property	Delinquent taxes	Other
AL	No				X					AK: Municipalities may adjust for any items they believe affect values.
AK	No		X	X	X	X	X	X		
AZ	Yes		X	X	X			X		AR: Assumed leases and any other non-real-estate considerations that significantly affect the price paid for a property
AR	Yes		X	X	X					
CA	No									CO: Fees that are atypical may warrant an adjustment. Independent contractor (auditor) may need to make appropriate non-real-property adjustments in the ratio studies.
CO	No		X	X	X	X	X	X	X	
CT	Yes	X								
DE	Yes									
DC	Yes		X							
FL	Yes		X	X	X	X	X	X		FL: We have the authority to adjust sale prices to match the assessment as of the date of valuation.
GA	Yes		X	X	X	X	X	X	X	GA: Standing timber value
HN	Yes			X	X					IN: Done at the local level.
ID	No		X		X					
IL	Yes		X							KS: Long-term leases and seller financing (when not at market rates), repair allowances, special assessments
IN	Yes		X							
IA	Yes				X					
KS	No		X	X	X	X	X	X	X	MI: These adjustments can be made in the local sales studies. Studies are not conducted at the state level.
KY	No	X								
LA			X							
ME	No	X								MO: No limitations on authority to implement adjustments
MD	Yes	X								
MA	Yes		X							NC: There is no law stating that we can or cannot make changes. We typically don't make any changes to be consistent.
MI	Yes		X	X	X			X		
MN	Yes		X	X	X	X	X	X		OR: If the department finds an error or failure to value property at 100% of Real Market Value, the department does have the authority to order changes but it is rarely used.
MS	Yes			X	X	X	X			
MO	No		X	X	X	X	X	X	X	
MT	Yes		X							SC: Counties are required to classify whether the sale is considered a good sale vs. bad sale for all the adjustments listed.
NE	Yes		X	X	X	X	X	X	X	
NV	Yes		X	X	X	X	X			WV: Only valid sales that are judged to be arm's-length sales are included in the assessment sales ratio.
NH	No		X		X					
NJ	Yes	X								
NM	Yes	X								
NY	Yes		X							
NC	Yes									
ND	No				X					
OH	Yes	X								
OK	No				X			X		
OR	Yes									
PA	Yes	X								
RI	Yes		X							
SC	No									
SD	No		X	X						
TN	No	X								
TX	No		X	X	X	X	X	X	X	
UT	No		X	X	X	X				
VT	Yes				X			X		
VA		X								
WA	Yes				X					
WV	Yes									
WI	Yes				X			X		
WY	Yes		X	X	X			X		

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q19							
	Which of the following adjustments to sale price do you use in your ratio studies?							
State	Time	Financing	Personal property	Closing costs	Brokerage fees	Intangible personal property	Delinquent taxes	Other
AL			X					AK: See Q18 response.
AK	X	X	X	X	X	X	X	AR: Assumed leases and any other non-real-estate considerations that significantly affect the price paid for a property
AZ	X		X			X		CO: Fees that are atypical may warrant an adjustment to the sale price to ensure that the sale price represents only real property. This is from the independent auditor perspective.
AR	X	X	X					CT: We do not adjust sales prices.
CA								FL: Local officials submit documentation to the Department asserting what percentage their assessments have been adjusted for cost and/or conditions of sale. The Department may choose to adjust sales prices according to this and other information.
CO	X	X	X	X	X	X	X	GA: Standing timber value
CT								IN: Done at the local level
DE								KS: Long-term leases and seller financing (when not at market rates), repair allowances, special assessments
DC	X							KY: None
FL	X							MD: None
GA	X		X			X		MN: Sales recorded on contract for deed or sales recorded on warranty deeds that include assumption of an existing mortgage or a seller-provided mortgage are adjusted.
HN			X					NJ: n/a
ID	X		X					NM: n/a
IL	X							OR: The items other than time are considered during sales verification and sale prices are adjusted to reflect variations from the norm. They are not adjusted as part of the ratio study. They are adjusted individually prior to utilization in the study.
IN	X							SC: Ratio study only includes good sales as reported by the counties.
IA			X					WV: Only valid sales that are judged to be arm's-length sales are included in the assessment sales ratio.
KS	X	X	X	X	X	X	X	
KY								
LA	X							
ME								
MD								
MA	X							
MI								
MN	X	X	X	X	X	X		
MS			X	X	X			
MO	X	X	X	X		X		
MT	X							
NE			X			X		
NV								
NH	X		X					
NJ								
NM								
NY	X		X			X		
NC								
ND			X					
OH								
OK			X			X		
OR	X							
PA								
RI	X							
SC								
SD		X	X					
TN								
TX	X	X	X	X	X	X	X	
UT	X	X	X	X				
VT			X					
VA								
WA			X					
WV								
WI			X			X		
WY	X	X	X			X		

Question No. >	Q20					Q21		
State	Which time adjustment methods do you use in ratio studies?					Other	Are blanket or global adjustments made to sales prices prior to computing ratios? If yes, describe	
	Tracking trends in sales ratios over time	Tracking changes in value per unit over time	Analysis of repeat sales	Not applicable				
AL			X			CA: Any method that is based on sound methodology and adequately reflects the market CO: This is from the independent auditor perspective. IN: Done at the local level. KS: MRA date of sale coefficient	No	CO: In some cases, the answer may be yes. There may be isolated examples in some counties. WA: 1% blanket adjustment on all real property sales to account for personal property.
AK	X						No	
AZ	X						No	
AR	X	X	X				No	
CA				X			No	
CO	X		X				No	
CT				X			No	
DE								
DC		X	X				No	
FL	X	X					Yes	
GA	X						No	
HN				X			No	
ID	X						No	
IL		X					No	
IN	X	X	X				No	
IA				X			No	
KS	X	X	X				No	
KY			X				No	
LA		X					No	
ME							No	
MD				X			No	
MA	X		X				No	
MI							No	
MN	X	X	X				No	
MS				X			No	
MO	X		X				No	
MT	X						No	
NE				X			No	
NV				X			No	
NH	X						No	
NJ				X		No		
NM						No		
NY	X					No		
NC						No		
ND				X		No		
OH						No		
OK	X					No		
OR	X		X			No		
PA						No		
RI	X					No		
SC				X		No		
SD				X		No		
TN				X		No		
TX		X				No		
UT	X	X	X			No		
VT				X		No		
VA				X		No		
WA				X		Yes		
WV				X		No		
WI	X					No		
WY	X	X				No		

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q22	Q23	
State	Regarding sample size, what is the smallest sample you will use to evaluate any category of property?	Do you establish sample size quotas or goals (e.g., 3 percent of parcels in category or a number based on a statistical sample size formula)?	
AL	10 to 19 observations	Yes	Minimum sample size of 1% of the county parcel count total when possible
AK	Less than 5 observations	No	
AZ	10 to 19 observations	No	
AR	Less than 5 observations	Yes	All valid sales less edits for Real Estate except Ag; Ag = 100 samples; Pers Prop = depends on size of county
CA		Yes	
CO	30 or more observations	Yes	30 or more is required or it must be supplemented by appraisal ratios.
CT	Less than 5 observations	No	
DE			
DC	10 to 19 observations	No	
FL	More than 30 observations	Yes	Formula based on COV.
GA	10 to 19 observations	Yes	IAAO formula
HN	Less than 5 observations	No	
ID	5 to 9 observations	No	
IL	20 to 30 observations	No	
IN	5 to 9 observations	No	
IA	2% or 10 observations	No	
KS	Less than 5 observations	No	
KY	20 to 30 observations	No	
LA	20 to 30 observations	Yes	
ME	20 to 30 observations	No	
MD	10 to 19 observations	Yes	For fewer than 10 commercial sales, ratio is not used for real property stats by class.
MA	5 to 9 observations	Yes	
MI		No	
MN	5 to 9 observations	Yes	No time adjustments or reporting of COD, PRD, or PRB unless at least 30 sales
MS	10 to 19 observations	No	
MO	20 to 30 observations	Yes	Based on statistical formulas developed for the agency
MT	More than 30 observations	No	
NE	No minimum	No	
NV		No	
NH	5 to 9 observations	No	
NJ	Less than 5 observations	No	
NM	More than 30 observations	No	
NY	Less than 5 observations	No	
NC	More than 30 observations	No	
ND	30 sales or 10% of parcels in the property class	Yes	30 sales or 10% of parcels in the property class
OH		Yes	100 sales is ideal, but not available for all jurisdictions.
OK	1 Ag. per township, 15 CM, 36 RES minimum	No	
OR	Less than 5 observations	No	
PA	Less than 5 observations	No	
RI	Depends on community. Some are small with limited sales. Sales ratio study is mostly on residential properties.	No	
SC	All sales that occurred in the prior year are used.	No	
SD	10 to 19 observations	No	
TN	Less than 5 observations	No	
TX	Residential, commercial, land 10–19; utility less than 5	Yes	
UT	10 to 19 observations	No	
VT	Less than 5 observations	No	
VA	5 to 9 observations	No	
WA	5 to 9 observations	No	
WV	At least 3 sales	No	
WI	Percentage of base selling	Yes	Varies by quality of COD and COC, and number of parcels in class. Generally no less than 1% of base selling; 3% is good indicator
WY	5 to 9 observations	No	

Question No. >	Q24										
	Check each measure of level that you calculate and indicate if it is used for direct and/or indirect (funding) equalization.										
State	ARITHMETIC MEAN—calculate	ARITHMETIC MEAN—use for direct equalization	ARITHMETIC MEAN—use for indirect equalization	MEDIAN—calculate	MEDIAN—use for direct equalization	MEDIAN—use for indirect equalization	WEIGHTED MEAN—calculate	WEIGHTED MEAN—use for direct equalization	WEIGHTED MEAN—use for indirect equalization	GEOMETRIC MEAN—calculate	GEOMETRIC MEAN—use for direct equalization
AL	X			X	X		X				
AK	X			X			X		X		
AZ				X	X		X		X		
AR				X	X						
CA											
CO				X		X					
CT	X			X		X	X				
DE											
DC	X			X			X				
FL	X			X			X		X		
GA				X		X	X		X		
HN	X			X			X				
ID	X			X	X		X		X	X	
IL				X	X	X					
IN	X		X	X		X					
IA				X	X	X					
KS	X			X			X			X	
KY				X							
LA	X			X							
ME	X		X								
MD	X			X			X				
MA	X			X			X		X		
MI											
MN	X		X	X	X		X		X		
MS	X			X			X				
MO	X			X	X		X				
MT	X			X			X				
NE	X	X	X	X	X	X	X	X	X		
NV				X	X						
NH	X			X			X		X	X	
NJ				X							
NM				X			X				
NY							X		X		
NC				X	X	X					
ND	X			X	X		X				
OH	X	X		X	X		X	X			
OK	X			X	X	X	X	X			
OR											
PA	X		X								
RI	X			X							
SC	X			X							
SD	X			X	X	X					
TN	X			X	X	X	X				
TX	X		X	X			X		X		
UT	X		X	X			X				
VT	X			X			X		X		
VA				X							
WA				X			X	X	X		
WV	X			X			X				
WI	X		X	X		X	X		X		
WY	X		X	X	X						

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q24 (continued)				
	Check each measure of level that you calculate and indicate if it is used for direct and/or indirect (funding) equalization.				
State	GEOMETRIC MEAN—use for indirect equalization	OTHER—calculate	OTHER—use for direct equalization	OTHER—use for indirect equalization	If other measure of level, specify:
AL					
AK					
AZ		X	X		COD
AR					
CA					
CO					
CT		X			We also calculate COD, COV, and PRD.
DE					
DC					
FL					
GA					
HN					
ID					
IL					COD, COC, PRD
IN					
IA					
KS		X			Broadened median ratio
KY					COD
LA					
ME					
MD					
MA					
MI					
MN					
MS		X			COD, regressivity
MO					
MT					
NE					
NV					
NH					
NJ		X	X		Weighted median by property class by vacant land, residential, farm, and other
NM		X			Standard deviation, COD, COV
NY					
NC					
ND					
OH					
OK					
OR				X	There is no direct correlation between funding and ratio studies in Oregon.
PA					
RI					
SC					An index of inequality is calculated and used to measure central tendencies along with the median ratio requirements.
SD					
TN					
TX					
UT					
VT					
VA					
WA					
WV					
WI					
WY					

Question No. >	Q25	Q26	Q27
State	Do you test the distribution of ratios to see if they are statistically normal?	Do you use confidence intervals (CIs) to determine statistical compliance with standards for appraisal level?	If the calculated level of assessment is 86% with a CI ranging from 76% to 95% for a particular group of properties, would you consider the level to be in compliance?
AL	Yes	No	
AK	No	No	n/a
AZ	Yes	Yes	Yes (the CI overlaps the required minimum level)
AR	Yes	Yes	Yes (the CI overlaps the required minimum level)
CA			
CO	No	No	
CT	No	No	
DE		No	
DC	Yes	No	
FL	Yes		
GA	Yes	Yes	Yes (the CI overlaps the required minimum level)
HN	Yes	Yes	No (the CI does not overlap 100%)
ID	Yes	Yes	Yes (the CI overlaps the required minimum level)
IL	Yes	No	
IN	No	Yes	Yes (the CI overlaps the required minimum level). The level of confidence used by the DLGF is 95% (two-tailed).
IA	No	No	
KS	Yes	Yes	Yes (the CI overlaps the required minimum level)
KY	No	No	
LA	No	No	
ME	Yes	No	
MD	Yes	No	
MA	No	No	
MI			
MN	No	No	
MS	Yes	Yes	Yes (the CI overlaps the required minimum level)
MO	No	Yes	Yes (the CI overlaps the required minimum level)
MT	Yes	Yes	Yes (the CI overlaps the required minimum level)
NE	No	No	
NV	No	No	
NH	Yes	Yes	No (the CI does not overlap 100%)
NJ	No	No	
NM	Yes	No	
NY	No	No	
NC	Yes	No	
ND	No	No	
OH	No	No	
OK	No	No	
OR	No	Yes	Yes, probably. Analysis of confidence levels is not an integral part of ratio reporting in this state but it should be (opinion).
PA	No	No	
RI	Yes	No	
SC	Yes	No	
SD	No	No	
TN	Yes	No	
TX	Yes	Yes	No (the CI does not overlap 100%)
UT	Yes	Yes	No (the CI does not overlap 100%)
VT	Yes	Yes	Yes (the CI overlaps the required minimum level)
VA	No	No	
WA	Yes	No	
WV	Yes	No	
WI	Yes	Yes	No. Compliance with state law is measured by how close the overall assessment of a class is to full value. Within 10% is acceptable.
WY	Yes	Yes	No (the CI does not overlap 100%)

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q28					
	If the calculated level of assessment is out of compliance except for the CI for a particular group of properties, and the calculated level of assessment remains below the required minimum level for several years, which action would your agency take?					
State	Lower the level of confidence and reevaluate	Base compliance decision on point estimates	Continue to find the jurisdiction in compliance	Other	Not applicable (CI not used to determine compliance)	Additional comments
AL					X	GA: Another agency takes action.
AK					X	
AZ			X			IN: Confidence interval, rather than the median ratio itself, is used to determine compliance with the level of assessment benchmark. Local officials would be advised to consider using more sales in their stratum.
AR			X			
CA						MS: Median Ratio for Class I—85-115; Median Ratio for Class II—75-125; Regressivity 0.92 to 1.08; COD of the Median <20
CO					X	
CT					X	NY: Would consider additional information before informing jurisdiction of noncompliance.
DE						
DC					X	RI: State law requires cities and towns to do a revaluation every 3 years. There is no requirement for an additional revaluation if the sales ratios are too high or too low.
FL						WI: Compliance with Wisconsin state law is measured by how close the overall assessment of a class is to full value. Within 10% is acceptable.
GA					X	WY: A work plan would be developed and state staff would be sent out to the local jurisdiction to assist in rectifying the problem.
HN	X					
ID	X					
IL						
IN				X		
IA					X	
KS			X			
KY					X	
LA					X	
ME					X	
MD					X	
MA					X	
MI						
MN					X	
MS				X		
MO			X			
MT						
NE		X				
NV					X	
NH					X	
NJ					X	
NM					X	
NY				X		
NC					X	
ND					X	
OH						
OK		X				
OR					X	
PA						
RI					X	
SC					X	
SD					X	
TN					X	
TX			X			
UT			X			
VT					X	
VA					X	
WA					X	
WV					X	
WI					X	
WY						

Question No. >	Q29										
State	Which measures or tests of price-related bias do you use?										
	Price-related differential (PRD) calculated	PRD used to test for compliance	Price-related bias (PRB) calculated	PRB used to test for compliance	Spearman-Rank calculated	Spearman-Rank used to test for compliance	Mann-Whitney Test calculated	Mann-Whitney Test used to test for compliance	t-test calculated	t-test used to test for compliance	Other
AL	X										FL: PRD, PRB and COD used as indicator for a potential systemic problem. SC: Only calculation used is the Index of Inequality Formula: 1/2 (Q3-Q1)divided by median; Q3 is third quartile and Q1 is first quartile. Answer is a percentage which must be less than 15% for approval.
AK	X										
AZ	X						X	X			
AR	X										
CA											
CO	X								X		
CT	X										
DE											
DC	X		X								
FL	X	X	X	X							
GA	X	X			X	X	X	X			
HN	X										
ID	X	X	X				X				
IL	X										
IN	X	X			X	X					
IA	X										
KS	X		X								
KY											
LA	X										
ME											
MD	X										
MA											
MI											
MN	X	X	X								
MS		X									
MO	X										
MT	X										
NE	X										
NV	X										
NH	X	X									
NJ											
NM	X										
NY	X										
NC	X										
ND	X										
OH	X										
OK	X										
OR	X										
PA											
RI	X										
SC											
SD	X										
TN	X										
TX	X								X		
UT	X										
VT	X				X				X		
VA	X										
WA											
WV		X									
WI	X										
WY	X	X									

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q30		Q31			
State	Are actions taken to correct price-related noncompliance?	If yes, describe	Do you calculate confidence intervals or related tests of statistical significance around any of the following?			
			Coefficient of dispersion (COD)	Price-related differential (PRD)	Price-related bias (PRB)	Not applicable
AL	No	FL: Used as a potential indicator of a systemic problem				X
AK	No					X
AZ	No	GA: Use aggregate instead of median	X			
AR	No	IN: Local officials are advised to review sales.	X			
CA						
CO	No	IA: Order a reappraisal				X
CT	No	MN: Advisory only				X
DE						
DC	No	OR: The county will be reminded that				X
FL	Yes	Department considers PRD to be a				
GA	Yes	significant indicator of uniformity but				X
HN	Yes	there is no statutory standard.				
ID	No	WV: Advisory only	X	X		
IL	No	WY: The actions to correct this would be	X	X	X	
IN	Yes	up to the State Board of Equalization.				X
IA	Yes					X
KS	No		X	X	X	
KY	No		X			
LA	No					X
ME	No		X			
MD	Yes		X	X		
MA	No					
MI			X	X		
MN	No				X	
MS	No		X	X		
MO	No		X			
MT	No		X			
NE	No					X
NV	No					X
NH	No		X	X		
NJ	No		X			
NM	No					X
NY	No					X
NC						X
ND	No					X
OH	No		X			
OK	No					X
OR	No		X			
PA						
RI	No		X			
SC	No					X
SD	No		X			
TN	No					X
TX	No					X
UT	No					X
VT	No		X			
VA	No					X
WA	No					X
WV	No		X			
WI	No					X
WY	Yes					

Question No. >	Q32					Q33
State	If you compute statewide ratio study statistical results, how are they made available?					Do you trim outlier ratios?
	Website	Publication	Not made available	Not applicable (we do not compute statewide ratio study statistical results)	Other	
AL			X		CO: The independent auditor (contractor) does not compile statewide ratio studies, but it does publish specific findings for each county in the annual auditor reports. CT: Reports are e-mailed to each municipality. RI: Printed copies available upon request..	Yes
AK				X		Yes
AZ		X				Yes
AR	X					Yes
CA				X		
CO		X		X		Yes
CT						No
DE				X		
DC				X		Yes
FL	X	X				Yes
GA	X					Yes
HN				X		Yes
ID	X					Yes
IL			X			Yes
IN				X		Yes
IA	X					No
KS	X	X				Yes
KY				X		No
LA		X				Yes
ME				X		Yes
MD	X	X				Yes
MA				X		No
MI				X		
MN	X					Yes
MS				X		Yes
MO				X		Yes
MT	X	X				Yes
NE	X	X				Yes
NV	X	X				
NH	X					Yes
NJ	X	X			No	
NM		X			Yes	
NY				X	Yes	
NC				X	No	
ND	X	X			No	
OH		X			Yes	
OK		X			Yes	
OR				X	Yes	
PA	X				Yes	
RI	X				No	
SC				X	Yes	
SD					No	
TN	X	X			Yes	
TX	X				No	
UT	X				No	
VT				X	Yes	
VA	X				Yes	
WA	X				Yes	
WV	X	X			Yes	
WI	X				Yes	
WY					Yes	

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q34							
State	If outliers are trimmed, what procedure do you use?							
	1.5 × interquartile range	3.0 × interquartile range	Beyond 2 standard deviations	Fixed symmetric points (e.g., remove ratios <0.50 or > 1.50)	Fixed asymmetric points (e.g., remove ratios <0.30 or > 2.00)	Good judgment	Look for logical break points	Other
AL						X	X	AR: Low-value property: lowest 10% of values and sales; high-value commercial property: any property that constitutes more than 5% of the total commercial value in a county; outlier edits: not more than 5% of sales filtered out based on ratio alone.
AK						X		
AZ	X							CA: The independent auditor's staff has used fixed symmetric points in the past, though they do not have to apply trimming at all. They have noted that they may apply trimming in special cases.
AR	X			X			X	
CA								CO: The independent auditor's staff has used fixed symmetric points in the past, though they do not have to apply trimming at all. They have noted that they may apply trimming in special cases.
CO				X		X		
CT								DC: Local officials are advised to use the IAAO standard.
DE								
DC					X	X		IL: Local officials are advised to use the IAAO standard.
FL					X			
GA	X							IN: Based on first and third quartile
HN			X					ME: 15% low; 15% high
ID	X	X	X				X	NE: Only if outliers affect measures of central tendency and do not have a constituency in the population.
IL								NM: Interquartile range is calculated and different multipliers used until the number of outliers is less than 10% of the total sample.
IN	X	X						
IA								OK: Deletion of extreme ratios on case-by-case basis, and only after individual review by field analyst.
KS	X							
KY								OR: Trimming method is determined at the county level but I encourage use of 1.5 × interquartile range. Actual county trimming is typically by "good judgment" or fixed point.
LA		X						
ME								RI: Municipalities will trim outliers when doing the revaluation.
MD				X	X			
MA								SC: Calculation based on difference between the third quartile and first quartile.
MI								
MN	X							WA: Trim ratios < 25% or > 175%
MS						X		
MO		X						WI: Also look at frequency table. Generally ±45% of median is purified.
MT	X							
NE								WV: Also look at frequency table. Generally ±45% of median is purified.
NV								
NH		X						WY: Also look at frequency table. Generally ±45% of median is purified.
NJ								
NM						X	X	
NY	X							
NC								
ND								
OH				X				
OK								
OR								
PA								
RI								
SC								
SD								
TN				X	X			
TX								
UT								
VT		X						
VA				X	X	X	X	
WA								
WV			X					
WI						X	X	
WY				X				

Question No. >	Q35	Q36				
	Is there a limit on the maximum percentage of sales that can be trimmed out of a sample? (e.g., 20%)	If you order adjustments to locally determined assessed or appraised values, which of the following procedures are used?				
State		Order local officials to apply trending factors to individual classes or categories of property	Trend all types of property equally based on a jurisdiction-wide adjustment factor	Give local officials a compliance grace period to apply indicated factors	No authority	Other
AL	No	X				AR: Corrective active is based on our findings.
AK	No				X	
AZ	No	X				CO: Only State Board of Equalization may order reappraisal.
AR	Yes; see Q34, Other					
CA					X	FL: Counties must meet threshold for level of assessment for tax roll to be approved.
CO	Yes; 5% on either side according to the last auditor			X		
CT					X	IA: Order reassessment of property
DE						
DC	No				X	LA: The assessors are given a 1-year grace period to reassess.
FL	No					
GA	Yes; 10% except in extreme cases				X	MI: State Equalization may require a factor applied by class of property.
HN	No				X	
ID	No	X		X		MS: County becomes noncompliant and has 2 years to reappraise.
IL	No					
IN	No			X		MO: Analyze ratio results to target specific appraisal component concerns
IA	No	X				
KS	Yes; up to 20 %			X		NE: Orders are issued by the Tax Equalization and Review Commission based on its review and our recommendation.
KY						
LA	No			X		NJ: Revaluations and reassessments are ordered by the County Board of Taxation.
ME	Yes; 15%				X	
MD	No					NM: Will advise assessors on suggested courses of action
MA	No					
MI		X				OK: State Board of Equalization has authority to order reappraisal or trending, not Ad Valorem Division as oversight agency.
MN	No	X				
MS	No					OR: Authority is in statute but not used.
MO	No	X				
MT	No			X		TN: Only in special situation of a jurisdiction with a 6-year reappraisal cycle falling below statutory levels in the third year, that is below 0.90 overall or any class more than 10 points from the overall median.
NE	No	X				
NV	No	X		X		WI: Major Class (5% of municipal full value) ratios must be within 10% of full value once in a 7-year period. State supervised revaluation follows if not in compliance. All property is revalued.
NH	No				X	
NJ	No					WV: State supervised revaluation follows if not in compliance. All property is revalued.
NM	Yes; 10% by custom, not statute or regulation					
NY	No				X	WY: State supervised revaluation follows if not in compliance. All property is revalued.
NC					X	
ND	No	X				WV: State supervised revaluation follows if not in compliance. All property is revalued.
OH	No	X		X		
OK	No	X				WV: State supervised revaluation follows if not in compliance. All property is revalued.
OR	No					
PA					X	WV: State supervised revaluation follows if not in compliance. All property is revalued.
RI	No				X	
SC	Yes; top 25%, bottom 25% are trimmed.				X	WV: State supervised revaluation follows if not in compliance. All property is revalued.
SD	No		X			
TN	No	X				WV: State supervised revaluation follows if not in compliance. All property is revalued.
TX					X	
UT		X				WV: State supervised revaluation follows if not in compliance. All property is revalued.
VT					X	
VA	No				X	WV: State supervised revaluation follows if not in compliance. All property is revalued.
WA	Yes; no greater than 5% of valid sales				X	
WV	No				X	WV: State supervised revaluation follows if not in compliance. All property is revalued.
WI	No			X		
WY	No	X	X	X		

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q37	Q38	Q39
State	How many local jurisdictions have been found out of compliance and ordered to ADJUST locally determined values in the past 3 years? (e.g., applying an adjustment factor)	Do you or another oversight agency have authority to order reappraisal of locally determined values?	How many local jurisdictions have been found out of compliance and ordered to REAPPRAISE locally determined values in the past 3 years?
AL	None	Yes	None
AK	n/a	No	n/a
AZ	None	Yes	None
AR	None	Yes	None
CA		No	
CO	None.	Yes	Two counties to correct procedural issues
CT		No	
DE			
DC		No	
FL	None	Yes	None
GA	n/a	Yes	Another agency has that data.
HN	None	No	None
ID	None	Yes	None
IL	None	No	
IN	None	Yes	None
IA	64 (2011 and 2013)	Yes	None
KS	None	Yes	None
KY	None	Yes	8
LA		Yes	6
ME	None	Yes	None
MD	n/a	Yes	n/a
MA	None	Yes	None
MI	None	Yes	
MN	57	Yes	None
MS		Yes	3
MO	18	Yes	None
MT	None	No	None
NE	2	No	None
NV		Yes	
NH		Yes	
NJ	None	Yes	229
NM	None	Yes	None
NY	State has no authority to order jurisdictions to adjust locally determined values.	No	State has no authority to order jurisdictions to reappraise locally determined values.
NC		Yes	
ND	25	No	None
OH	We usually obtain compliance short of an order.	Yes	All (88) have been ordered to reappraise or update.
OK	2	Yes	2
OR	None	No	None
PA		No	
RI	Municipalities do revaluations every 3 years.	No	No jurisdiction to require revaluation
SC	n/a	Yes	None
SD		Yes	
TN	None	No	None
TX		No	
UT	3	Yes	None
VT		Yes	
VA		No	
WA		No	
WV	Yes	Yes	
WI	None have been ordered. Annually 7–8 jurisdictions wait until last year, then revalue on their own.	Yes	None
WY		Yes	

Question No. >	Q40	Q41	Q42
State	Do you have a statutorily defined level(s) of assessment? (for example, 100% for all property or percentages that vary by property type)	What are your ratio study standards for acceptable level of appraisal?	If you have appraisal level standards, how are they set?
AL	Yes	Median, 85% to 105%	Administrative rule or regulation
AK	Yes	0.90-1.10	Statute, IAAO Standards
AZ	Yes	74% to 90%	Statute
AR	Yes	0.90-1.10	Statute
CA			
CO	Yes	0.95-1.05	Administrative rule or regulation
CT	Yes		
DE			
DC	Yes	0.90-1.10	Administrative rule or regulation
FL	Yes	Equal or greater to 90%	Administrative rule or regulation; standards set by State.
GA	Yes	0.90-1.10	Administrative rule or regulation
HN	Yes	0.90-1.10	Administrative rule or regulation
ID	Yes	0.90-1.10	Administrative rule or regulation
IL	Yes		
IN	Yes	0.90-1.10	Administrative rule or regulation
IA	Yes	0.95-1.05	Statute
KS	Yes	0.90-1.10	Administrative rule or regulation
KY	Yes	Depending on sale year for study 0.90-1.10	Administrative rule or regulation
LA	Yes	0.90-1.10	Statute
ME	Yes	70% and up	Statute
MD	No	0.90-1.10	Administrative rule or regulation
MA	Yes	0.90-1.10	Administrative rule or regulation
MI	Yes		
MN	Yes	0.95-1.05	Administrative rule or regulation
MS	Yes	See Q28 response.	Statute
MO	Yes	0.90-1.10	Admin rule or regulation; set by a vote of Commission as policy
MT	Yes	0.90-1.10	Administrative rule or regulation
NE	Yes	0.92-1.00 for residential and commercial; 0.69-0.75 for agricultural land	Statute
NV	Yes	0.32 to 0.36 (level of assessment is 0.35)	Statute
NH	Yes	0.90-1.10	Administrative rule or regulation
NJ	Yes	15% of average ratio	Statute
NM	Yes	0.90-1.10	Statute
NY	No		
NC	No		
ND	Yes	0.90-1.00	Maximum 1.00 statutory; minimum 0.90 administrative
OH	Yes	0.90-1.10	Administrative rule or regulation; at the discretion of the agency
OK	Yes	State Board of Equalization Defined Range	Administrative rule or regulation; constitutional, SBOE policy, legal precedent
OR	Yes		Statute
PA	No		
RI	No	The ratio is used to adjust the town's assessed value.	Statute, no state level
SC	Yes	Median between 80-105% with index of less than 15%	Administrative rule or regulation
SD	Yes	85-100	Statute
TN	No	There are no limits except (see question 36)	Statute
TX	Yes	0.95-1.05	Statute
UT	Yes	0.90-1.10	Administrative rule or regulation
VT	Yes	>0.80	Statute
VA	Yes	0.70-1.30	Statute
WA	Yes	0.90-1.10	Administrative rule or regulation
WV	Yes	0.90-1.10	Statute
WI	Yes	0.90-1.10	Statute
WY	Yes	0.95-1.05	Administrative rule or regulation

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q43				Q44	
State	Which of the following uniformity measures are calculated or used to make compliance determinations?				If you have specific standards or requirements based on the COD, what is the highest acceptable COD for each of the following categories?	
	Coefficient of dispersion (COD) calculated	COD used to test for compliance	Coefficient of variation (COV) calculated	COV used to test for compliance	Residential	Commercial/Industrial
AL	X	X				
AK	X				n/a	n/a
AZ	X	X			20	25
AR	X	X			15 for newer market areas, 20 for all others	25 for counties <50,000 parcels, 20 all others
CA						
CO	X	X			15.99	20.99
CT	X		X			
DE						
DC	X					
FL	X	X	X	X	Based on IAAO Standard on Ratio Studies	Based on IAAO Standard on Ratio Studies
GA	X	X			15	20
HN	X		X			
ID	X	X	X		15	20
IL	X	X				
IN	X	X			Improved: less than or equal to 15.0	Less than or equal to 20.0
IA	X				20	20
KS	X	X	X		20	20
KY	X				20	20
LA	X	X			20	20
ME					20	n/a
MD	X					
MA	X	X	X		20	20
MI						
MN	X		X		20	25
MS	X					
MO	X	X			20 (sales study-trimmed); 25 (appraisal study-untrimmed)	30
MT	X					
NE	X				15	20
NV	X	X			15	25
NH	X	X			20	20
NJ	X	X			COD over 15	COD over 15
NM	X	X	X		15	20
NY	X					
NC						
ND	X					
OH	X				15	20
OK	X	X			20	20
OR	X				10 urban homogeneous, 15 nonhomogeneous, 20 rural	20
PA	X					
RI	X					
SC						
SD					20	20
TN	X		X			
TX	X	X			30	30
UT	X	X	X	X	20	25
VT	X					
VA	X					
WA	X					
WV	X				Improved 15 or less	20 or less
WI						
WY	X	X	X		15 or less	20 or less

Question No. >	Q44 (continued)				Q45
	If you have specific standards or requirements based on the COD, what is the highest acceptable COD for each of the following categories?				If you have a standard for price-related bias (vertical inequity) based on the PRD, what is the standard?
State	Farmland	Timberland	Vacant Land	Other	
AL				20 countywide, all property types	
AK	n/a	n/a	n/a	n/a	PRD 0.98 to 1.03
AZ			25		
AR	n/a	n/a	25	n/a	PRD 0.98 to 1.03, IAAO, not state
CA					
CO	n/a	n/a	20.99	n/a	PRD 0.98 to 1.03
CT					
DE					
DC	n/a	n/a		IAAO standard	PRD 0.98 to 1.03
FL	Based on IAAO Ratio Study Standard	Based on IAAO Ratio Study Standard	Based on IAAO Ratio Study Standard	Based on IAAO Ratio Study Standard	PRD 0.98 to 1.03
GA	20	20	20		PRD 0.98 to 1.03
HN					
ID	n/a	n/a	20		PRD 0.98 to 1.03
IL					PRD 0.98 to 1.03
IN	n/a	n/a	Less than or equal to 20.0		PRD 0.98 to 1.03
IA	n/a	n/a	n/a		n/a
KS	n/a	n/a	20		PRD 0.98 to 1.03
KY	20				
LA			20		
ME	n/a	n/a	n/a		
MD					n/a
MA	20	20	20		
MI					
MN	20	20	25		PRD 0.98 to 1.03
MS					
MO	30	30	30		PRD 0.98 to 1.03
MT					PRD 0.98 to 1.03
NE	25	25	25		PRD 0.98 to 1.03
NV	25		15		
NH	20	20	20		PRD 0.98 to 1.03
NJ	n/a	n/a	COD over 15	COD over 15	n/a
NM	20	20	20		PRD 0.98 to 1.03
NY				15 high density, 17 medium density, 20 low density	PRD 0.98 to 1.03
NC					
ND					
OH					PRD 0.98 to 1.03
OK	20	20	20		
OR	nonspecific	nonspecific	20	25 manufactured structures, 12 for multifamily	PRD 0.98 to 1.03, nonstatutory
PA					
RI				Municipalities use IAAO standards for revaluation.	Municipalities might use.
SC				COD is not used	Index of inequality
SD	20				
TN				No requirements	PRD 0.98 to 1.03
TX	30	30	30		PRD 0.98 to 1.03
UT	25		25		PRD 0.98 to 1.03
VT				<20 for all combined	PRD 0.98 to 1.03
VA					
WA					
WV	n/a	n/a	20 or less		PRD 0.98 to 1.03
WI				COD is not measured for compliance.	n/a
WY			20 or less		PRD 0.98 to 1.03

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q46	Q47				
State	Do you have a standard for price-related bias (vertical inequity) based on the PRB?	What actions can your agency initiate as a result of assessment uniformity conditions?				
		None	Order a reappraisal	Withhold funding (e.g., revenue sharing)	Other	Additional comments
AL	No		X			AR: Require corrective action
AK	No			X		CA: If a county's overall assessment level is found to be outside of statutorily prescribed limits, the assessor's office is ineligible for county reimbursement for certain administrative costs.
AZ	No		X			
AR	No		X	X	X	CO: This agency may recommend a reappraisal order, but that function is more applicable to the auditor. The State Board of Equalization issues the reappraisal order.
CA					X	IL: Withhold multiplier (factor)
CO	No		X		X	IN: Generally, local officials will be instructed to review and adjust assessments to achieve conformity; however, if needed, a reappraisal could be ordered.
CT	No	X				KS: Remove appraiser from office.
DE		X				MT: The Property Assessment Division is responsible for assessing all property on a statewide basis
DC	No	X				NH: Appeal to NH Board of Tax and Land Appeals who have authority to order reassessment
FL	Based on IAAO ratio study standard		X			NC: Not applicable
GA	No	X				ND: Raise or lower assessments
HN			X			OH: Use to gauge overall quality of the appraisal and to make assessors aware of potential problems in the assessment.
ID	± 0.10 using 95% confidence interval	X				OK: Agency provides recommendations to State Board of Equalization for action.
IL			X		X	OR: It is possible to withhold minor funding but the action has not been taken to my knowledge.
IN	No		X			RI: When the State is paying for a portion of the statistical revaluation, it could withhold payment for the revaluation services. In Rhode Island because of municipalities' staff sizes, the revaluation is done by an outside company.
IA	No		X			SC: Tax notices can not be mailed until in compliance.
KS	No		X	X	X	UT: One year is given to get into compliance.
KY	No		X			WV: Reasonable steps to remedy assessment deficiencies
LA	No		X			WI: If owners of 5% of the property in a municipality petition for a reassessment, state does a uniformity study and can order reassessment.
ME	No	X				Otherwise, poor uniformity does not result in sanctions.
MD	No		X			
MA						
MI						
MN	No		X			
MS	No		X	X		
MO	No	X				
MT	No				X	
NE	No		X			
NV	No	X				
NH	No		X		X	
NJ	No		X			
NM	No	X				
NY	No	X				
NC		X				
ND	No				X	
OH					X	
OK	No				X	
OR	No			X	X	
PA		X				
RI	No	X			X	
SC	No			X	X	
SD			X			
TN	No	X				
TX	No			X		
UT	No		X	X		
VT			X	X		
VA	No	X				
WA	No	X				
WV	No					
WI	n/a	X			X	
WY			X			

Question No. >	Q48	Q49	Q50	Q51
State	If you initiate action as a result of assessment uniformity conditions, is the action dependent upon confidence intervals or related tests of statistical significance?	If your agency can order a reappraisal or withhold funding as a result of assessment uniformity conditions, how many times has it been done in the past 3 years?	Do you have statutory requirements to check for sales chasing?	Do you test for sales chasing?
AL	No	None	No	No
AK	No	None	No	No
AZ	Yes, for COD	None	No	Yes
AR	Yes, for COD	1	Nonstatutory requirement	Yes
CA	Not applicable			
CO	Yes, for COD	Not applicable to this agency	No	Yes
CT	Not applicable		No	No
DE				
DC	Not applicable			Yes
FL		None	No	Yes
GA	Not applicable	n/a	Nonstatutory requirement	Yes
HN	Not applicable	None	No	Yes
ID	Not applicable	n/a	Nonstatutory requirement	Yes
IL	No	None	No	No
IN	No	None	Nonstatutory requirement	Yes
IA	Not applicable	None	No	No
KS	Yes, for COD	None	No	Yes
KY	No		No	No
LA	No	4	No	No
ME	Not applicable	None	No	Yes
MD	Not applicable	None	No	No
MA			No	No
MI			Yes	Yes
MN	Yes, for PRD	None	Nonstatutory requirement	Yes
MS	Yes, for COD	3	No	Yes
MO	Not applicable	n/a	No	Yes
MT	Not applicable	None	No	Yes
NE	No	None	Nonstatutory requirement	Yes
NV	Yes, for COD		No	No
NH	Not applicable		No	No
NJ	Yes, for COD	None	Nonstatutory requirement	No
NM	Not applicable	n/a	No	Yes
NY	Not applicable		No	Yes
NC	Not applicable		No	Yes
ND				No
OH	Not applicable		No	Yes
OK	No		No	No
OR	No	None	No	No
PA	No			No
RI	Not applicable	None	No	No
SC	Yes, for PRD	None	No	No
SD	Not applicable		No	Yes
TN	Not applicable		Nonstatutory requirement	Yes
TX	No	35	Yes	Yes
UT	Yes, for COD	Almost once	Nonstatutory requirement	Yes
VT	No	71	Nonstatutory requirement	Yes
VA	No		No	No
WA	Not applicable		No	Yes
WV	Yes, for COD		Nonstatutory requirement	Yes
WI	Yes, for COD	n/a	No	Yes
WY	No		Yes	Yes

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q52					
	If you test for sales chasing, what techniques do you use?					
State	Comparison of average percentage changes in appraised values of sold and unsold properties	Comparison of average unit values of sold and unsold properties	Split sample technique (using sales before and after the appraisal date)	Comparison of observed vs. expected distribution of ratios	Mass appraisal techniques	Additional comments
AL						AR: Compare median and mean value changes between sold and unsold. We also use the Mann-Whitney test to determine the statistical reliability of observed differences. IN: Methods listed in the IAAO <i>Standard on Ratio Studies</i> . The Mann-Whitney test is the most commonly employed method. KS: Additional tests are performed if the sample is suspect. NY: Evaluate coefficient of binary variable for sold properties used to regress on natural log of sale prices. Next, compare weighted mean estimate produced by study using assessments established prior to earliest sale date, and adjust for change in level of assessment for the current year. NC: We sometimes ask for the prior year values to see if the value has been changed due to a sale.
AK						
AZ	X					
AR	X				X	
CA						
CO	X	X	X		X	
CT						
DE						
DC	X					
FL	X		X	X		
GA	X			X		
HN						
ID	X					
IL						
IN	X					
IA						
KS	X		X	X		
KY						
LA						
ME	X		X			
MD						
MA						
MI	X				X	
MN	X	X	X	X		
MS				X	X	
MO	X		X			
MT					X	
NE	X		X			
NV						
NH						
NJ						
NM				X		
NY	X					
NC						
ND						
OH	X					
OK						
OR						
PA						
RI						
SC						
SD			X			
TN	X		X			
TX	X			X		
UT	X					
VT		X				
VA						
WA	X	X				
WV			X		X	
WI			X	X		
WY						

Question No. >	Q53		Q54	Q55		
State	Has a lower limit on the COD been established as an indicator of possible sales chasing?	Additional comments	Is a ratio study conducted for personal property?	How are the results of your personal property ratio study used?		
				To order adjustments to locally determined assessed values	To equalize state funding of local jurisdictions	To order local jurisdictions to reappraise
AL	No	CO: The auditor, not this agency, tests for sales chasing according to standards established by the State Board.	No			
AK	No		No			
AZ	No	FL: COD = 5	No			
AR	Yes		No	Yes	X	
CA		ID: Additional review of sample and population for categories with COD <5	Yes			
CO	No		No	Yes	X	X
CT	No	MN: CODs under 5 are viewed as possible indicators of sales chasing	No			
DE			Not applicable			
DC	No	MO: COD = 5	No			
FL	Yes		No	No		
GA	No	NE: CODs under 5 are viewed as possible indicators of sales chasing.	No			
HN	No		No	No		
ID	Yes	OH: No, but COD helps confirm the practice.	No			
IL	No		No	No		
IN	No	UT: We look at the IAAO standard when needed.	No			
IA	No		No	No		
KS	No	UT: We look at the IAAO standard when needed.	No			
KY	No		No	No		
LA	No		No			
ME	Yes		No	No		
MD	No		No			
MA	No		No	No		
MI	No		No			
MN	Yes		No	No		
MS	No		No			
MO	Yes		No	No		
MT	No		No			
NE	Yes		No	No		
NV	No		Yes			
NH	No		No	No		
NJ	No		No			
NM	Yes		No	No		
NY	No		No			
NC	No		No	No		
ND	No		No			
OH	No		No	No		
OK	No		No			
OR	No		No	No		
PA						
RI	No		No	No		
SC	No		No			
SD	No		No	No		
TN	No		No			
TX	No		No	Yes		X
UT	No		No			
VT	No		No	No		
VA	No		No			
WA	No		Yes			X
WV	No		No			
WI	No		No	No		
WY	No		No			

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q55 (continued)					Q56
State	How are the results of your personal property ratio study used?					Does your agency perform procedural audits of local assessment procedures/practices?
	To advise state or local jurisdictions of assessment conditions	To assist mass appraisal programs	To approve tax assessment roll	To adjust or equalize centrally determined assessed values (such as utilities)	Other	
AL						No
AK						Yes
AZ						No
AR	X	X				Yes
CA						Yes
CO		X				Yes
CT						No
DE						
DC						No
FL						Yes
GA						No
HN						No
ID						No
IL						
IN						No
IA						No
KS						Yes
KY						Yes
LA						No
ME						No
MD						No
MA						Yes
MI						Yes
MN						Yes
MS						Yes
MO						Yes
MT						No
NE						Yes
NV	X					Yes
NH						Yes
NJ						No
NM						Yes
NY						Yes
NC						No
ND						No
OH						No
OK						Yes
OR						No
PA						No
RI						No
SC						No
SD						Yes
TN						Yes
TX						Yes
UT						Yes
VT						No
VA						No
WA	X			X		Yes
WV						Yes
WI						Yes
WY						Yes

Question No. >	Q57						Q58
	If your agency performs a procedural audit of local assessment procedures/practices—which categories of real property are audited?						If your agency performs a procedural audit of local assessment procedures/practices—is the audit used INSTEAD OF a ratio study?
State	Residential	Commercial/ Industrial	Agricultural	Timberland	Not applicable	Other	
AL					X	CA: All property types may be covered by the audit.	
AK	X	X	X			CO: Vacant land classes of real property as well as taxable personal property. The independent auditor (contractor) performs the audits.	Not applicable
AZ					X		No
AR	X	X	X	X		MI: Commerical and industrial	Yes
CA	X	X	X	X		NH: Monitor assessment practices to determine whether they have met or not met standards	
CO	X	X	X			NY: All property types, as part of review of reassessments, where state financial assistance is involved	Not applicable
CT					X	WA: CU Agricultural Land Audit performed if 15% or more of total real property assessed value is in CU Ag program.	No
DE						WI: Audit consists of whether general compliance with USPAP standards was maintained, based on self-reporting form.	Not applicable
DC							Not applicable
FL	X	X					No
GA					X		Not applicable
HN							Not applicable
ID					X		Not applicable
IL					X		Not applicable
IN							Not applicable
IA					X		Not applicable
KS	X	X					
KY	X	X	X				No
LA					X		Not applicable
ME							No
MD					X		Not applicable
MA	X	X	X	X			No
MI	X	X	X	X			No
MN	X	X	X	X			No
MS	X	X	X	X			No
MO	X	X					No
MT							Not applicable
NE	X	X	X				No
NV	X	X	X				No
NH							No
NJ					X		Not applicable
NM	X	X	X				No
NY							Yes
NC							
ND					X		
OH							Not applicable
OK	X	X	X				
OR					X		Not applicable
PA							
RI					X		Not applicable
SC							No
SD	X	X	X				
TN	X	X	X	X			No
TX	X	X	X	X			No
UT	X	X	X				No
VT							
VA							Not applicable
WA			X				
WV	X	X	X				
WI							No
WY	X	X	X				

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q58 (continued)	Q59					
State	If your agency performs a procedural audit of local assessment procedures/practices—is the audit used INSTEAD OF a ratio study? Additional comments	If your agency performs a procedural audit, how is it used?					
		To order adjustments to locally determined assessed values	To order local jurisdictions to reappraise	To advise state or local jurisdictions of deficiencies or to recommend improvements in assessment procedures	To approve tax assessment roll	Not applicable	
AL	AK: Many of our municipalities have fewer than 10 sales each year. Ratio studies would not reflect the job being done, so we depend on the audit to show us if the job is being completed as it should be.					X	
AK				X			
AZ						X	
AR			X	X	X		
CA		CO: Both procedural and statistical auditing procedures/practices are used by the independent auditor (contractor).			X		
CO							
CT							X
DE		KS: In conjunction with the ratio study, 50% statistical/ 50% procedural for substantial compliance					
DC							
FL		OK: Procedural audit used in conjunction with ratio study. Compliance actions may be initiated by State Board of Equalization on both/either.			X		
GA						X	
HN						X	
ID	WA: Results of audit factored into real property ratio calculation.						X
IL							X
IN	WV: Used in conjunction with ratio study						X
IA							X
KS					X	X	
KY						X	
LA							X
ME					X		
MD							X
MA			X	X	X		
MI				X	X		
MN					X		
MS					X		
MO				X			
MT						X	
NE				X			
NV				X			
NH				X			
NJ						X	
NM				X			
NY							
NC							
ND							
OH						X	
OK							
OR						X	
PA							
RI						X	
SC						X	
SD				X			
TN				X			
TX				X			
UT				X			
VT						X	
VA						X	
WA				X			
WV				X			
WI				X			
WY				X			

Question No. >	Q59 (continued)	Q60			Q61		
State	If your agency performs a procedural audit, how is it used? Other	Can any of the following initiate legal action as a result of your ratio study?			What software does your agency use for ratio studies?		
		Taxing jurisdiction (e.g., school district)	Taxpayers	Not applicable	Custom software written in-house	CAMA vendor application	Spreadsheet software (e.g., Excel)
AL	AR: To require corrective action if necessary.			X			
AK	CO: Same as noted in previous responses.			X			X
AZ	NY: To review local reassessment projects where state financial assistance is involved.			X			X
AR		X	X				X
CA	OK: Present recommendations to State Board of Equalization for compliance actions						
CO				X	X	X	X
CT				X	X		
DE							
DC							
FL		X			X		X
GA				X	X	X	X
HN				X		X	
ID				X	X		X
IL							
IN				X			X
IA		X					
KS		X	X		X		X
KY		X	X				
LA					X		X
ME			X				
MD				X	X		
MA				X	X		X
MI				X			
MN				X			
MS		X	X				X
MO			X				X
MT				X			
NE		X			X		X
NV							X
NH		X			X		
NJ		X	X				
NM				X			X
NY		X					
NC		X	X				
ND							X
OH					X		
OK		X			X		X
OR				X			
PA		X					
RI				X	X		
SC				X	X		
SD		X	X		X		
TN		X			X	X	
TX		X			X	X	X
UT				X	X		
VT				X			
VA				X			X
WA		X	X		X		X
WV		X	X			X	X
WI		X			X	X	
WY						X	X

Appendix C. United States 2013 Survey Results (continued)

Question No. >	Q61 (continued)			
State	What software does your agency use for ratio studies?			Additional comments
	Statistical software (e.g., SPSS, NCS, SAS)	Database software (e.g., Access)	Not applicable	
AL	X			ME: 480 individual municipalities; may each use their own method WI: Vendor supplied software, Tyler Technologies' IPAS; state requested modifications.
AK				
AZ	X			
AR	X			
CA				
CO	X	X		
CT		X		
DE				
DC	X			
FL	X	X		
GA		X		
HN				
ID				
IL				
IN	X			
IA	X			
KS				
KY	X			
LA				
ME			X	
MD				
MA				
MI			X	
MN	X			
MS				
MO	X	X		
MT	X			
NE				
NV		X		
NH				
NJ		X		
NM				
NY	X			
NC		X		
ND			X	
OH				
OK	X	X		
OR			X	
PA				
RI				
SC				
SD				
TN		X		
TX	X	X		
UT	X	X		
VT	X			
VA				
WA				
WV				
WI				
WY	X			

Question No. >	Q62		Q63
State	Do you currently use any foreclosure-related sales in your ratio studies? If yes, describe criteria.		Please provide comments about new issues or recent changes related to your ratio study practices:
AL	No	AK: But if a municipality determines that they are reflective of the market they may certainly use foreclosed sales.	GA: New legislation requiring parcels with arm's-length sales from prior year to have a maximum appraised value not to exceed the arm's-length-sale value for the next year regardless of the calculated appraisal.
AK	Yes		
AZ	Yes	ID: May be used provided they constitute more than 20% of the available sales in a category being tested. Must be validated to account for changes in property characteristics and checked to remove any vandalized properties. Parameters found in rule, so have force of law.	ID: Planning to provide more education to assessors regarding PRB
AR	No		
CA		IN: When foreclosure-related sales constitute the preponderance of sales in an area, or research shows little difference between foreclosure and conventional sales, then validated foreclosure-related sales can be used without adjustment.	MN: We added the PRB and the interquartile range for trimming ratios. There has been much controversy around the use of time trends, but we continue to adjust for time.
CO	Yes		
CT	No	KS: If a county provides documentation through the informal ratio study process that foreclosure-related sales affect a neighborhood, etc., PVD will reexamine all these type sales for the area, include them, and rerun the stats. To date, no county has made the request.	OK: New State Board of Equalization Performance Audit for 2013 (Procedural). Replaces an old procedural audit.
DE			
DC	Yes	MO: Follow IAAO's Guide to Foreclosure-related Sales	SC: The state has adopted a point of sale for all properties when a transfer occurs. Based on this statutory change, ratio studies are now falling in the 100% range because properties are reappraised the year after the sale occurs.
FL	No		
GA	Yes	RI: The recent economic conditions showed that some communities had mostly foreclosure sales.	TX: We continue to follow IAAO standards unless statutes present limitations.
HN	No		
ID	Yes	SD: Previously prevented by statute from using sales of 1) Any property that sold for more than 150% of assessed value; 2) Any ag property that sold for more than 150% of ag income value; 3) Any ag property that sold in increments of 70 acres or less.	WA: All counties are required to be on annual revaluation cycle by 2014. Sales time period for ratio studies is expanding from 8 months to 1 year beginning in 2014.
IL	Yes		
IN	Yes	UT: Determined market by market	
IA	No		
KS	No	WA: Bank owned re-sales if sale price is influencing the market. Caution given to counties to verify condition of property at time of the sale.	
KY	No		
LA	No	WI: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
ME	No		
MD	No	We have now gone to productivity valuation on agricultural land. The 150% of ag income and 70 acre statutes have been repealed. The 150% of assessed value sales are being phased in over the next 4 years.	
MA	Yes		
MI	Yes	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
MN	No		
MS	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
MO	Yes		
MT	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
NE	Yes		
NV	n/a	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
NH	No		
NJ	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
NM	No		
NY	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
NC	No		
ND	n/a	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
OH	No		
OK	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
OR			
PA		VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
RI	Yes		
SC	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
SD	Yes		
TN	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
TX	Yes		
UT	Yes	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
VT	No		
VA	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
WA	Yes		
WV	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	
WI	Yes		
WY	No	VT: Resales of foreclosed properties, if they meet criteria of arm's-length transaction, are included. Time on market is generally biggest determinant of usability.	

Appendix D. Results of 2013 Survey of Ratio Study Practices in Canada

Question No. >		Q2	Q3	Q4	
Province	Abbreviation	What is your jurisdiction type?	How often does your jurisdiction conduct ratio studies?	Who conducts the provincial ratio study?	Other
Alberta	AB	Provincial agency	Annual	Provincial officials/local officials/contractor	NS: PVSC internal audit ON: Internal studies for quality control purposes only. No requirement to report findings to provincial officials. QC: Each municipality does its own ratio study. The provincial government validates the information.
British Columbia	BC	Provincial agency	Annual	Provincial officials	
New Brunswick	NB	Provincial agency	Annual	Provincial officials	
Newfoundland	NL	Provincial agency	Every 3 years	Provincial officials	
Manitoba	MB	Provincial agency	For biennial reassessments	Provincial officials	
Nova Scotia	NS	Municipally controlled not-for-profit corporation—Property Valuation Service Corporation (PVSC)	Annual	Provincial officials	
Ontario	ON	Not-for-profit municipal corporation	Other	Local officials	
Prince Edward Island	PEI	Provincial agency	Annual not legislated; used for assessment	Provincial officials	
Quebec	QC	Government agency	Annual	Provincial officials/local officials	
Saskatchewan	SK	Provincial agency	Annual	Provincial officials	

No. >		Q5						
		How is your ratio study used?						
Province	To order adjustments to locally determined assessed values if necessary	To equalize provincial funding of local jurisdictions	To order local jurisdictions to reappraise	To advise assessment officials of assessment conditions	To assist mass appraisal programs	To approve tax assessment roll	To adjust or equalize centrally determined assessed values (such as utilities)	Other
AB	X	X	X	X		X		NS: Reassessment is conducted annually in NS. PVSC staff conduct ratio studies in order to determine filed roll assessment values for the 54 municipal units. ON: Ontario is on a four-year revaluation cycle. MPAC produces and publishes ratio studies in its annual report for the new valuation date only. QC: n/a SK: Statutory requirement for an annual "primary audit" for roll confirmation purposes is the focus of the SK survey responses. There are additional "quality assurance standards" in SK for property valued using the market valuation standard (not related to roll confirmation). These standards require an overall level of value from 0.95 to 1.05 for two property groups—all residential sales and all commercial sales—provided the municipality targets 1.00.
BC				X	X			
NB				X	X			
NL				X	X			
MB					X			
NS				X	X			
ON					X			
PEI	X			X	X			
QC								
SK	X		X			X		

Note: n/a = not applicable

No. >	Q6	Q7	Q8	Q9
Province	Have you incorporated portions of the IAAO <i>Standard on Ratio Studies</i> in your statutes or rules and regulations?	Which of the following does the provincial real property ratio study include?	If the provincial agency uses both sales and appraisals, can they be combined in order to study one type or category of property?	What was the assessment date tested with the province's most recent ratio study?
AB	Yes	Sales only	Not applicable	07/01/2012
BC	Yes	Sales only	Not applicable	12/05/2012
NB	Yes	Sales only	Not applicable	
NL	Yes	Sales only	Not applicable	
MB	No	Sales only	Not applicable	04/01/2012
NS	Yes	Sales only	Not applicable	January 1, 2011 base date for 2013 filled roll
ON	No	Sales only	Not applicable	01/01/2012
PEI	No	Sales only	Not applicable	January 2010 to October 2012
QC	No	Sales only	Not applicable	July 1, 2011 for the applicable rolls in 2013-2014-2015
SK	No	Sales only	Not applicable	January 1; 2011; SK has a 4-year revaluation cycle.

No. >	Q10						
Province	What is the time period from which sales are used in the provincial ratio study?						
	One year	Multiple years	Flexible time period (varies by jurisdiction or category)	Sale period mostly before assessment date	Sale period mostly after assessment date	Sale period equally before and after the assessment date	Additional comments
AB			X	X			<p>NS: 2013 filed roll, base date time frame: sales July 1, 2010 through June 30, 2011</p> <p>ON: Try to include sales used in the mass appraisal process (up to 3-5 years worth) and then 1 year of sales post valuation date. The tribunal board likes to review sales 1 year on either side of the valuation date typically.</p> <p>SK: Base date is January 1, 2011. Sales are allowed up to December 31, 2010.</p>
BC						X	
NB	X			X			
NL		X		X			
MB				X			
NS	X					X	
ON				X			
PEI		X					
QC						X	
SK		X		X			

No. >	Q11	Q12	Q13	
Province	Which jurisdiction primarily performs the sales sample selection?	Which jurisdiction primarily conducts the sales validation (screening)?	If the provincial agency does NOT conduct the sales validation, does the agency perform an audit of the sales validation process? If yes, briefly summarize the audit policy.	
AB	Local	Local	Yes	<p>AB: We receive all sales through our land registry office and compare to ensure all sales are reported. We also have measure percent of sales used.</p> <p>NS: PVSC Internal Audit conducts weekly and quarterly electronic audits that focus on identifying specific exceptions as well as multiple annual audit controls that take a broader look at the sales validation process.</p>
BC	Province	Provincial agency	n/a	
NB	Province	Provincial agency	Yes	
NL	Province	Provincial agency	n/a	
MB	Province	Provincial agency	n/a	
NS	Property Valuation Services Corp. staff	PVSC staff	Yes	
ON	Local MPAC office validates sales.	Local MPAC office validates sales.	No	
PEI	Province	Provincial agency	n/a	
QC	Province	Local	No	
SK	Local	Local	No	

Appendix D. Canadian 2013 Survey Results (continued)

No. >	Q14	Q15	Q16	
Province	Does your jurisdiction have a law requiring disclosure of real estate sale prices to assessment officials?	Are disclosed sale prices public records?	Is a value-related fee charged (e.g., transfer tax, deed stamp) for real property transfers? If yes, state the rate(s) and describe the structure.	
AB	Yes, disclosure made to both	Yes	No	<p>NS: Most municipal units (MUs) levy a deed transfer tax based on a percentage of the purchase price. The percentage varies among the MUs.</p> <p>ON: The province has a land transfer tax regulated through the Ministry of Finance. The City of Toronto has special legislation that allows it to have its own land transfer tax as well.</p> <p>PEI: Real Property Transfer Tax Act states that anyone who registers a deed in the province of Prince Edward Island must pay, at the time of registration, a tax computed at the rate of 1 percent of the greater of the purchase price and the assessed value of the real property. Some exemptions apply. Refer to website: http://www.taxandland.pe.ca/index.php3?number=1039461&lang=E.</p>
BC	Yes, disclosure made to provincial officials	Yes	Yes	
NB	Yes, disclosure made to provincial officials	Yes	Yes	
NL	Yes, disclosure made to provincial officials	Yes	Yes	
MB	Yes, disclosure made to provincial officials	Yes	Yes	
NS	No	Yes	Yes	
ON	Yes, disclosure made to both	Yes	Yes	
PEI	Yes, disclosure made to provincial officials	Yes	Yes	
QC	Yes, disclosure made to provincial officials	Yes	Yes	
SK	Yes, disclosure made to provincial officials	Yes	Yes	

No. >	Q17	Q18								
Province	Does your jurisdiction have a law making recordation/registration mandatory for real property transfers?	Which of the following adjustments to sale price do you have authority to implement in your ratio studies?								
		No authority to implement adjustments	Time	Financing	Personal property	Closing costs	Brokerage fees	Intangible personal property	Delinquent taxes	Other
AB	Yes		X	X	X			X		NL: HST (Harmonized Sales Tax)
BC	Yes		X	X	X	X		X	X	
NB	Yes	X								
NL	Yes		X	X	X					
MB	Yes	X								
NS	Yes		X	X	X	X	X	X	X	
ON	Yes		X	X	X					
PEI	Yes		X							
QC	Yes		X		X			X		
SK	Yes	X								

No. >	Q19							
Province	Which of the following adjustments to sale price do you use in your ratio studies?							
	Time	Financing	Personal property	Closing costs	Brokerage fees	Intangible personal property	Delinquent taxes	Other
AB	X	X	X			X		AB: Although allowed in our ratio studies, it is extremely rare to have adjustments other than time and chattel adjustments.
BC	X	X	X	X		X	X	
NB								NL: HST (Harmonized Sales Tax)
NL	X		X					NS: Time adjustment not required for most ratio studies, which are based on sale dates 6 months before and after the base date of value. The last four items rarely require adjustment as they are generally excluded from sale prices.
MB								
NS	X	X	X	X	X	X	X	ON: MPAC will typically adjust for time and invalidate or adjust sales that involve atypical financing, chattel, etc.
ON	X	X	X					
PEI								SK: Adjustments are applied by the local assessor prior to the ASR study.
QC	X		X			X		
SK								

No. >	Q20					Q21
Province	Which time adjustment methods do you use in your ratio studies?					Are blanket or global adjustments made to sales prices prior to computing ratios? (For example, some jurisdictions adjust all prices down by 1 percent in an attempt to adjust for personal property that is difficult to isolate sale by sale; others might adjust all sales by 10 percent for financing considerations.)
	Tracking trends in sales ratios over time	Tracking changes in value per unit over time	Analysis of repeat sales	Not applicable	Other	
AB	X	X			ON: For mass appraisal work, time is included in the equation to develop a rate of change. Sales post valuation date SAR is used. SK: Any adjustment is made by the local assessor prior to the ASR study.	No
BC	X		X			No
NB						No
NL	X		X			No
MB						No
NS			X			No
ON	X					No
PEI				X		No
QC	X					No
SK						No

No. >	Q22	Q23
Province	Regarding sample size, what is the smallest sample you will use to evaluate any category of property?	Do you establish sample size quotas or goals (e.g., 3 percent of parcels in category or a number based on a statistical sample size formula)?
AB	Less than 5 observations	Yes; strata with less than 15 sales are combined with other similar strata. Very small municipalities may have less than 5 or no sales.
BC	15 valid sales	Yes; 15 is the minimum sample size.
NB	Less than 5 observations	No
NL	10 to 19 observations	No
MB	8	No
NS	5 to 9; 5 qualified non-outlier sales is the smallest sample used.	No
ON		No
PEI	If sample is deemed too small, sample area is increased.	No
QC	20 to 30 observations	No
SK	All improved sales used to value property are submitted by the local assessor and used for the primary audit.	No

No. >	Q24									
Province	Check each measure of level that you calculate and indicate if it is used for direct and/or indirect (funding) equalization.									
	ARITHMETIC MEAN—calculate	ARITHMETIC MEAN—use for direct equalization	ARITHMETIC MEAN—use for indirect equalization	MEDIAN—calculate	MEDIAN—use for direct equalization	MEDIAN—use for indirect equalization	WEIGHTED MEAN—calculate	WEIGHTED MEAN—use for direct equalization	WEIGHTED MEAN—use for indirect equalization	
AB				X		X				
BC				X						
NB										
NL	X			X			X			
MB				X						
NS	X			X			X			
ON										
PEI	X			X			X			
QC				X	X					
SK				X						

Appendix D. Canadian 2013 Survey Results (continued)

No. >	Q24 (continued)					
	Check each measure of level that you calculate and indicate if it is used for direct and/or indirect (funding) equalization.					
Province	GEOMETRIC MEAN—calculate	GEOMETRIC MEAN—use for direct equalization	GEOMETRIC MEAN—use for indirect equalization	OTHER—calculate	OTHER—use for direct equalization	OTHER—use for indirect equalization
AB						
BC						
NB						
NL						
MB	X					
NS						
ON						
PEI						
QC						
SK						

If other measure of level, specify:
 AB: We calculate a median for value range strata, and then we calculate a weighted median ratio or overall ratio that is used in indirect equalization.
 ON: MPAC does not produce ratio studies for this purpose.

No. >	Q25	Q26	Q27
	Do you test the distribution of ratios to see if they are statistically normal?	Do you use confidence intervals (CIs) to determine statistical compliance with standards for appraisal level?	If the calculated level of assessment is 86% with a CI ranging from 76% to 95% for a particular group of properties, would you consider the level to be in compliance?
AB	No	No	
BC	Yes	Not applicable	
NB	Yes	Not applicable	
NL	No	Not applicable	
MB	Yes	Yes	No (the CI does not overlap 100%)
NS	No	No	
ON		Yes	No (the CI does not overlap 100%)
PEI	Yes	Not applicable	
QC	Yes	Yes	Yes (the CI overlaps the required minimum level)
SK	No	No	

No. >	Q28				
	If the calculated level of assessment is out of compliance except for the CI for a particular group of properties, and the calculated level of assessment remains below the required minimum level for several years, which action would your agency take?				
Province	Lower the level of confidence and reevaluate	Base the compliance decision on point estimates	Continue to find the jurisdiction in compliance	Other	Not applicable (CI not used to determine compliance)
AB					X
BC					X
NB					X
NL					
MB					X
NS					X
ON					X
PEI					X
QC					
SK					X

Additional comments
 QC: We advise local jurisdiction.

No. >		Q29										
Province	Which measures or tests of price-related bias do you use?										Other	
	Price-related differential (PRD) calculated	PRD used to test for compliance	Price-related bias (PRB) calculated	PRB used to test for compliance	Spearman-Rank calculated	Spearman-Rank used to test for compliance	Mann-Whitney Test calculated	Mann-Whitney Test used to test for compliance	t-test calculated	t-test used to test for compliance		
AB	X											ON: PRB will be written into our procedures going forward. Don't put much faith in the PRD. PRB ensures equity across broad range of property characteristics.
BC	X											
NB	X	X										
NL	X	X										
MB	X											
NS	X	X										
ON	X											
PEI	X											
QC		X										
SK												

No. >		Q30		Q31		
Province	Are actions taken to correct price-related noncompliance?		Do you calculate confidence intervals or related tests of statistical significance around any of the following?			
			Coefficient of dispersion (COD)	Price-related differential (PRD)	Price-related bias (PRB)	Not applicable
AB	No					X
BC	No					X
NB	No		X	X		
NL	Yes; sale information review, data review, and reinspection where required		X	X		
MB	Suitable investigations would take place.		X	X		
NS	Yes, during reassessment; if noncompliance is identified, action is undertaken to attain compliance.					X
ON	No		X			
PEI	No		X			
QC	Yes					X
SK	No					X

No. >		Q32					Q33
Province	If you compute province-wide ratio study statistical results, how are they made available?					Other	Do you trim outlier ratios?
	Website	Publication	Not made available	Not applicable (we do not compute province-wide ratio study statistical results)			
AB	X				NS: The levels of assessment of the 54 municipalities are published in PVSC annual report. PEI: Statistical results are for internal use. SK: Primary audits are conducted on a municipality basis only. These statutory audit reports are available by website.	No	
BC	X	X				Yes	
NB						Yes	
NL						Yes	
MB			X			Yes	
NS	X	X				Yes	
ON	X	X				Yes	
PEI			X			Yes	
QC				X		Yes	
SK				X		No	

Appendix D. Canadian 2013 Survey Results (continued)

No. >	Q34							
Province	If outliers are trimmed, what procedure do you use?							
	1.5× interquartile range	3.0× interquartile range	Beyond 2 standard deviations	Fixed symmetric points (e.g., remove ratios <0.50 or > 1.50)	Fixed asymmetric points (e.g., remove ratios <0.30 or > 2.00)	Good judgment	Look for logical break points	Other
AB								AB: Some outliers may be trimmed by the local assessor when the ratios are extreme but there are no guidelines for trimming. ON: When conducting ratio studies, I report three numbers—no outliers removed, 1.5× IRQ removed and 3.0× IRQ removed for internal reporting. Public documents—all outliers removed SK: n/a
BC						X		
NB				X				
NL	X	X						
MB	X							
NS	X							
ON	X	X						
PEI						X	X	
QC			X					
SK								

No. >	Q35	Q36				
Province	Is there a limit on the maximum percentage of sales that can be trimmed out of a sample? (e.g., 20%)	If you order adjustments to locally determined assessed or appraised values, which of the following procedures are used?				
		Order local officials to apply trending factors to individual classes or categories of property	Trend all types of property equally, based on a jurisdiction-wide adjustment factor	Give local officials a compliance grace period to apply indicated factors	No authority	Other
AB	No					AB: Local authorities must meet regulated standards in order to complete their assessment roll. If it is found that sales are missing or adjustments are inappropriate, they make the changes and resubmit sales information. If this results in them not making standards, they are equalized with new assessment level and ordered to correct for next assessment year. NS: Not applicable. There are no “locally determined assessed or appraised values” in Nova Scotia. PVSC has complete responsibility for determining assessments for the 54 municipalities. PEI: Province is responsible for assessment values. SK: Corrective action required per statutory primary audit.
BC	No				X	
NB	No				X	
NL	No	X				
MB	No				X	
NS	Yes; 20% (PVSC aims for 10%, 20% in extreme cases)					
ON	No					
PEI	No					
QC	No					
SK						

No. >	Q37	Q38	Q39	Q40
Province	How many local jurisdictions have been found out of compliance and ordered to ADJUST locally determined values in the past 3 years? (e.g., applying an adjustment factor)	Do you or another oversight agency have authority to order reappraisal of locally determined values?	How many local jurisdictions have been found out of compliance and ordered to REAPPRAISE locally determined values in the past 3 years?	Do you have a statutorily defined level(s) of assessment? (for example, 100% for all property or percentages that vary by property type)
AB	In 2012, there were 13 municipalities out of compliance. They were not ordered to adjust values locally.	Yes	None	Yes
BC		No		No
NB				
NL				
MB				
NS	Not applicable; see Q36	n/a	Not applicable; see Q36	No
ON	None	Yes	None	No
PEI	Province is responsible for assessment values.	Yes	Province is responsible for assessment values.	No
QC	None	No	None	Yes
SK	None	Yes	None	Yes

No. >	Q41	Q42	Q43			
Province	What are your ratio study standards for acceptable level of appraisal?	If you have appraisal level standards, how are they set?	Which of the following uniformity measures are calculated or used to make compliance determinations?			
			Coefficient of dispersion (COD) calculated	COD used to test for compliance	Coefficient of variation (COV) calculated	COV used to test for compliance
AB	0.95–1.05	Admin. rule or regulation	X	X		
BC	0.90–1.10	Admin. rule or regulation	X			
NB	0.90–1.10	Admin. rule or regulation	X			
NL	0.90–1.10	Admin. rule or regulation	X	X	X	
MB	0.90–1.10	Admin. rule or regulation	X			
NS	0.90–1.10; internal goal/objective of 0.95–1.05	By reference to IAAO standards	X	X		
ON	Varies by location and property type—urban residential 0.98–1.02	Internal standards that mirror IAAO	X	X	X	
PEI	0.90–1.10	Admin. rule or regulation				
QC	0.95–1.05	Statute				
SK	0.98–1.02	Statute				

No. >	Q44					
Province	If you have specific standards or requirements based on the COD, what is the highest acceptable COD for each of the following categories?					
	Residential	Commercial/Industrial	Farmland	Timberland	Vacant Land	Other
AB	15, except for multifamily	20	n/a	n/a	20	
BC	15	20				
NB						
NL	New homogeneous—10 or less; older heterogeneous—15 or less; rural—20 or less	Larger urban—15 or less; smaller rural—20 or less			20 or less	Other real property varies with local conditions.
MB						
NS	20	20	20	20	20	
ON	20	20	20	n/a	25	
PEI						
QC						
SK	n/a	n/a	n/a	n/a	n/a	n/a

No. >	Q45	Q46	Q47				
Province	If you have a standard for price-related bias (vertical inequity) based on the PRD, what is the standard?	Do you have a standard for price-related bias (vertical inequity) based on the PRB?	What actions can your agency initiate as a result of assessment uniformity conditions?				
			None	Order a reappraisal	Withhold funding (e.g., revenue sharing)	Other	Additional comments
AB	PRD 0.98 to 1.03 but not regulated	No		X		X	AB: Municipalities are not able to complete assessment roll if COD is not met. If an audit finds that they don't meet the requirement, they are ordered to correct for next year.
BC	PRD 0.98 to 1.03	No				X	
NB	PRD 0.98 to 1.03		X				
NL	PRD 0.98 to 1.03			X			
MB		No					NS: Further to Q30, uniformity concerns are generally identified during ratio study testing of preliminary assessments. Inputs are revised as required to achieve acceptable uniformity for the finalized, filed assessments.
NS	PRD 0.98 to 1.03	No					
ON	PRD 0.98 to 1.03	Yes; apply recommended IAAO standards	X				PEI: Reappraise work unit areas or selected property types
PEI		No		X		X	
QC	n/a		X				SK: There are no statutory uniformity requirements.
SK	None	No	X			X	

Appendix D. Canadian 2013 Survey Results (continued)

No. >	Q48	Q49	Q50	Q51
Province	If you initiate action as a result of assessment uniformity conditions, is the action dependent upon confidence intervals or related tests of statistical significance?	If your agency can order a reappraisal or withhold funding as a result of assessment uniformity conditions, how many times has it been done in the past 3 years?	Do you have statutory requirements to check for sales chasing?	Do you test for sales chasing?
AB	No		Nonstatutory requirement	Yes
BC	n/a		Nonstatutory requirement	Yes
NB			No	No
NL		None	No	Yes
MB			No	Yes
NS	n/a	n/a	Nonstatutory requirement	Yes
ON	n/a	n/a	n/a	Yes
PEI	No	n/a	No	No
QC	n/a	n/a	No	No
SK	n/a	n/a	No	No

No. >	Q52					
Province	If you test for sales chasing, what techniques do you use?					
	Comparison of average percentage changes in appraised values of sold and unsold properties	Comparison of average unit values of sold and unsold properties	Split sample technique (using sales before and after the appraisal date)	Comparison of observed vs. expected distribution of ratios	Mass appraisal techniques	Additional comments
AB	X					
BC	X			X		
NB						
NL	X	X				
MB				X		
NS	X					
ON	X	X			X	
PEI						
QC						
SK						

No. >	Q53	Q54	Q55
Province	Has a lower limit on the COD been established as an indicator of possible sales chasing?	Is a ratio study conducted for personal property?	How are the results of your personal property ratio study used?
AB	Yes; we flag and review any CODs of less than 5.	No	n/a
BC	Yes; anything less than 5 for residential single-family dwellings	No	n/a
NB	No	No	n/a
NL	No	No	n/a
MB	No	No	n/a
NS	Yes	No	n/a
ON	No; but ideally we don't want to see a COD below 5	No	n/a
PEI	Assessment rates are determined using sales analysis and mass appraisal techniques.	No	n/a
QC	n/a	No	n/a
SK	No	No	n/a

No. >	Q56	Q57					
	Does your agency perform procedural audits of local assessment procedures/practices?	If your agency performs a procedural audit of local assessment procedures/practices—which categories of real property are audited?					
Province		Residential	Commercial/Industrial	Agricultural	Timberland	Not applicable	Other
AB	Yes	X	X	X			<p>AB: All properties including our regulated properties, which include machinery and equipment used in manufacturing. We also review items such as assessment notices and other administrative items as the need arises.</p> <p>PEI: Province is responsible for assessment values and conducts procedural audits on itself.</p> <p>SK: There is a statutory provision for "secondary audits" which may include a procedural audit component.</p>
BC	Yes	X	X	X	X		
NB	Yes	X	X	X			
NL	Yes	X	X				
MB	No						
NS	No					X	
ON	Yes	X	X	X			
PEI	Yes	X	X	X	X		
QC	No					X	
SK	Yes	X	X	X			

No. >	Q58	Q59					
	If your agency performs a procedural audit of local assessment procedures/practices—is the audit used INSTEAD OF a ratio study?	If your agency performs a procedural audit, how is it used?					
Province		To order adjustments to locally determined assessed values	To order local jurisdictions to reappraise	To advise provincial or local jurisdictions of deficiencies or to recommend improvements in assessment procedures	To approve tax assessment roll	n/a	Other
AB	No; typically used to supplement ratio study		X	X			<p>AB: Intent is to improve overall quality of assessments.</p> <p>NS: Procedural audits are conducted internally. If areas of noncompliance are identified, corrective actions are implemented as applicable.</p> <p>SK: The findings of a secondary audit may result in recommendations for corrective actions.</p>
BC	No			X			
NB	No			X			
NL	No			X			
MB							
NS	Not applicable						
ON	No			X			
PEI	No	X		X			
QC						X	
SK	No; secondary audit of procedural practices is separate from the annual primary audit for roll confirmation purposes.						

No. >	Q60	Q61								
	Can any of the following initiate legal action as a result of your ratio study?	What software does your agency use for ratio studies?								
Province		Taxing jurisdiction (e.g., school district)	Taxpayers	Not applicable	Custom software written in-house	CAMA vendor application	Spreadsheet software (e.g., Excel)	Statistical software (e.g., SPSS, NCSS, SAS)	Database software (e.g., Access)	Not applicable
AB	X						X			BC: The database software we use is COGNOS.
BC			X	X		X	X	X		
NB			X	X						
NL			X		X	X	X			
MB			X	X						
NS	X	X				X	X			
ON			X				X			
PEI						X	X	X		
QC				X				X		
SK			X	X		X	X			

Appendix D. Canadian 2013 Survey Results (continued)

No. >	Q62	Q63
Province	Do you currently use any foreclosure-related sales in your ratio studies?	Please provide comments about new issues or recent changes related to your ratio study practices
AB	No	AB: Improvements are being contemplated/initiated to simplify the ratio study while maintaining currency and representativeness.
BC	No	BC: In 2011, a new program was established to collect inventory on sold properties. The program allows a more systematic use of MLS data to ensure the inventory on sold properties is current. This new program has had little impact on sold vs. unsold analysis. In 2013, a new program using risk-based mapping as an estimate of COD has been implemented as a possible alternative to ratio studies.
NB	No	
NL	No	NS: PVSC adopted the interquartile range method for identifying outliers, instead of using hard endpoints at 0.40 and 1.60, to more closely comply with IAAO standards.
MB	No	SK: Only improved property sales are used in ratio study for residential and nonresidential property class for the statutory primary audit.
NS	No	
ON	No	
PEI	No	
QC	No	
SK	No	