

**Final Report**  
**Review of Arkansas Sales Ratio and Equalization Studies**

**by**

**Robert J. Gloudemans**  
**Almy, Gloudemans, Jacobs & Denne**

**March 27, 2004**

## Table of Contents

Acknowledgements .....	3
1. Introduction .....	4
2. Legal Framework and Institutional Setting.....	5
2.1 Act 1185 .....	5
2.2 Amendment 79 .....	6
2.3 Authority for Responsibilities of ACD .....	6
2.4 Valuation and Ratio Study Standards and Enforcement.....	7
2.5 Statutory Strengths and Weaknesses .....	8
2.6 ACD Rules .....	8
2.7 Staffing of ACD .....	11
3. Role of Ratio Studies .....	11
3.1 Overview of Ratio Studies .....	11
3.2 Aspects of Appraisal Performance .....	12
3.3 Direct and Indirect Equalization .....	13
3.4 Steps in Ratio Studies .....	13
4. Data Assembly and Sales Validation .....	15
4.1 Use of Assessor-Assigned Validation Codes .....	15
4.2 Electronic Validation .....	16
4.3 Recommendations for Sales Validation .....	16
4.4 Electronic Transmission of Assessment Files .....	17
5. Technical Issues .....	17
5.1 Sample Size and Representativeness .....	17
5.2 Time Adjustments .....	18
5.3 Stratification .....	19
5.4 Interpretation and Enforcement of Level Standards .....	19
5.5 High-Value Properties .....	20
5.6 Uniformity Standards .....	21
5.7 Selective Appraisal of Sold Properties .....	21
6. Summary of Recommendations .....	22

## **Acknowledgements**

The author wishes to acknowledge the excellent cooperation and support received from ACD Director, Debbie Asbury, and her staff, including Page Kutait, Deputy Director; John Boyce, Manger of Field Operations; John Zimple, Manager of Education and Research; Bob Leslie, Legal Counsel; and Rita Rollins, Administrative Manager. Special thanks to Fred Rush, Ratio Study Coordinator, for his patience in explaining the history and intricacies of the present studies and related rules and guidelines.

This study and related open discussions with ACD staff demonstrate the commitment of the Assessment Coordination Department to an effective, state-of-the-art ratio study designed to ensure valuation accuracy and fairness in Arkansas. Robert J. Gludemans wrote the report and is responsible for its findings and conclusions.

**Final Report (March 27, 2004)**  
**Review of Arkansas Sales Ratio and Equalization Studies**

by

**Robert J. Gloudemans**  
**Almy, Gloudemans, Jacobs & Denne**

**1. Introduction**

The Arkansas Assessment Coordination Department (ACD) asked for a review of its sales ratio and equalization studies conducted in conjunction with countywide revaluations, now mandated every 3 or 5 years depending on whether counties are classified as high-growth or slow-growth. Although almost all states undertake such studies, the credibility of the studies is particularly important in Arkansas because (a) once determined, values are not updated for another 3 or 5 years and (b) values are used directly in school aid calculations rather than adjusted annually based on assessment level calculations as in many other states. ACD's ratio study conducted at time of reappraisal, along with its related audit of reappraisal procedures, are the mechanisms by which the State ensures that assessments are accurate and equitable among counties and classes of property.

This study was occasioned in part because ACD is transitioning from an approach based on random samples of sales to an approach using all validated sales. This approach increases sample size and provides for improved representivity and accuracy, but it also implies changes in the way data is processed and analyzed.

Although ACD studies four property types (real property appraised on a market value standard, agricultural property appraised on the basis of productivity, business personal property, and automobiles and other personal property), the present study focuses on only the first component.

The author visited the offices of ACD to interview the ACD director and key staff; reviewed relevant statutes, rules, and guidelines; and examined a sample of data files and statistical reports prepared by the Department. The focus of this study is on procedures and methodology. No attempt was made to judge the accuracy of data used or results reported in previous studies.

Section 2 below discusses the legal setting and institutional background, section 3 provides an overview of ratio studies in general and ACD's studies in particular, section 4 examines issues of data assembly and sales processing under the new initiatives, section 5 discusses key technical issues, and section 6 highlights important recommendations raised in the earlier discussions.

Arkansas statutes, and Act 1185 in particular, demonstrate a strong commitment to high levels of accuracy and equity in property assessments and professionalism in property tax administration. Statutes assign ACD the responsibility of monitoring reappraisals to ensure that they achieve those standards. To its credit, ACD has set out on a program to critically review and improve its ratio study program. It is hoped that this study will contribute to that process.

## **2. Legal Framework and Institutional Setting**

### **2.1 Act 1185**

To improve property tax administration in the State, in 1999 the 82<sup>nd</sup> General Assembly passed and the Governor signed Act 1185. Aside from designated exceptions, Act 1185 requires each county to appraise all real property at “full and fair value” at least every three years. Under a schedule to be determined by the Assessment Coordination Department (ACD), one-third of counties were directed to reappraise in 2002, one-third in 2003, and one-third in 2004 with increases in assessed values phased in over three years.

In enacting Act 1185, the legislature declared that its objective was “to establish and promote a uniform system of real property assessments within each county of the state and among the counties.” To accomplish this objective, the ACD was directed, as it deemed necessary, to develop and implement rules to be followed by the counties in the discovery, listing, and valuation of property. It further authorized the Department on behalf of the counties to contract with private companies to carry out the appraisal and assessment functions. Each county was directed to follow the reappraisal procedures established by the Department and file a reappraisal plan, including a proposed budget and designated reappraisal manager (who may be the County assessor or employee provided they meet qualification requirements), with the Department by July 1 of the year preceding commencement of the reappraisal. Computer-assisted mass appraisal (CAMA) systems must be approved by the Department and the Department “shall have access and capability to retrieve data stored in each county’s CAMA systems via phone lines and modem.”

To ensure the wherewithal to accomplish its objectives, ACT 1185 further established the “Arkansas Real Property Reappraisal Fund” to be used to pay counties and professional reappraisal companies to reappraise property as required by the Act. The Director of ACD distributes funds monthly provided that the reappraisal plan, rules, and procedures established by the Department are being followed. If requirements are not met, the contract “shall be promptly terminated” and the Department shall negotiate another contract for completion of the project.

Stating that “It is hereby found and determined by the General Assembly of the State of Arkansas that the ad valorem tax system in the state is of critical importance to the state

and its citizens; that many property assessments in this state are erroneous and need to be revised...”, the General Assembly declared an emergency is implementing Act 1185.

Act 1185 is a clear, bold statement of the commitment of the General Assembly to a strong, fair system of property assessment in the State. It establishes high expectations and requirements and empowers the ACD with the rule making and audit authority necessary for effective implementation. In a rare expression of commitment on the part of state legislatures, it further provides the fiscal resources necessary to counties and their contractors to accomplish the mandated reappraisals. Act 1185 stands as a noble expression of legislative commitment to fair and uniform assessments.

## **2.2 Amendment 79**

In 2000, Arkansas voters approved Amendment #2 (now know as Amendment 79), which provides several limits on assessed values and property taxes. It implemented a \$300 homestead credit (not to exceed the amount of taxes owed) for qualifying residential property. It also imposed a 5% cap on assessment increases for homestead residential property and a similar 10% cap on assessment increases for other real property, provided that the increases are not due to new construction or “substantial improvements” to the property.

In effect, Amendment 79 requires assessors to keep track of two values: market values and limited values. Aside from new construction and improvements, the latter may increase annually by the specified percentage until (if ever) it equates to market value. Aside from its administrative burden, the 5% and 10% limits are unfortunate in that they favor better-situated properties, for which values have increased more rapidly, over properties with more modest increases. Required tax rate rollbacks are a better way to control growth in property taxes following a reappraisal.

## **2.3 Authority and Responsibilities of ACD**

Act 436 of 1997 created the Assessment Coordination Department (ACD), which previously was the misplaced Assessment Coordination Division of the Public Service Commission. Statutes give ACD full power to supervise the assessment of real property and to equalize real property value (except for property remaining under the jurisdiction of the Tax Division of the Public Service Commission).

Much of ACD’s work involves procedural audits to ensure that sales are properly processed, that property inspections are accurate, that effective appraisal methods are used, that reappraisal plans are being followed, and that reappraisal funds are being used wisely. Although these studies have been controversial at times and are critical to ensuring that legislative goals for an effective, fair assessment system are being achieved, this aspect of ACD’s work is outside the scope of the present study. It is recommended that ACD undertake a separate review of the procedural audit study, with a view to reviewing current methodology and recommended improvements, including new approaches and use of technology.

With respect to monitoring reappraisal results and equalization, A.C.A 26-26-304 directs ACD to prepare a ratio study by classification for each county and school district in reassessment years. “This ratio study shall be based on sales-to-assessment ratios supplemented with appraisal to assessment ratios as required to meet generally accepted statistical techniques.” The study is to be based on sales that occurred in the preceding calendar year, although up to three years of sales or supplemental appraisals can be used to obtain statistically reliable sample sizes. Counties are to report all sales occurring in a calendar year by January 31 of the following year and ACD is to report a preliminary ratio (based on prior year’s assessed values) to the county by March 1 of the assessment year and a final ratio (based on the new assessments) by August 1. The studies are to be based on IAAO ratio study standards.

## **2.4 Valuation and Ratio Study Standards and Enforcement**

Consistent with Act 1185, A.C.A. 26-26-1902 mandates that, aside from certain exceptions, real property be appraised at “its full and fair market value at a minimum of every three years.” However, an exception is provided for slow growth counties, which need only appraise once every five years. A slow growth county is defined as one in which the growth in market value as a result of a three-year reappraisal was less than 15%. If a county qualifies for a five-year cycle and the increase in market value determined upon completion of the five-year reappraisal is greater than 25%, then the county must comply with the three-year cycle in its next reappraisal

Once market values are determined, they are factored by 20% to compute assessed values to which tax rates are applied. Statutes also provide for rollback of tax rates following a reappraisal in order to prevent taxes from escalating as a result. The rationale of the 20% factor is not clear, but presumably it is meant to make assessments more palatable to taxpayers. In reality, the factor plays no useful purpose and only potentially confuses taxpayers who wish to evaluate the accuracy and fairness of their assessments.

Consistent with IAAO standards, A.C.A 26-26-304 requires a ratio of .18 to .22 (corresponding to 90% to 110% of market value) for each classification of real property. If ACD determines that a county has failed the assessment level standard or is otherwise not in compliance with IAAO standards, it is directed to order and supervise adjustments to property values in the problem classes. If the contractor is found to be deficient in failing the required standards, the contractor is to bear the cost of the adjustments. If a county fails to make the required adjustments, funds may be withheld for up to one year until the adjustments are made (if not made within one year, the funds are deposited in the State general fund). Although counties may appeal the findings to the ACD Director, no higher arbitration body is specified (presumably an aggrieved party could pursue the matter in the courts).

The reference in A.C.A 26-26-304(e)(2) to other “ratio standards found in the International Association of Assessing Officers’ standards on ratio studies” obviously refers to IAAO uniformity standards, namely for the coefficient of dispersion (COD) and

price-related differential (PRD). To date, however, ACD has not attempted to enforce these standards.

## **2.5 Statutory Strengths and Weaknesses**

Although not the primary focus of this review, we will take the opportunity to comment on the framework for property tax administration provided by the Arkansas constitution and statutes. As stated, Arkansas statutes (particularly as expressed in Act 1185) provide a strong commitment to accurate and uniform assessments. Particularly laudable are the provision for full reappraisals at three or five year intervals (following a period in which many values had not been updated in well over a decade), promulgation of IAAO standards, establishment of the Arkansas reappraisal fund, and delegation of adequate authority in the ACD to supervise and enforce compliance with statutory mandates.

On the negative side, appraisal in Arkansas is viewed as a periodic exercise. Contrary to IAAO policy and standards, annual updates to assessments are not mandated (or even permitted). Periodic reassessment without annual updates induces complacency and superficial contact with the market in interim years. It also makes it difficult to justify full-time professional appraisal staff. Periodic reappraisal with annual updates would provide for continual tracking of the market and more uniform values, with the prospect of stronger assessment offices, than the current framework

Another fundamental reason for comparatively weak assessment offices in Arkansas is the unfortunate (and rare) two-year reelection cycle for assessors. The assessor's office is not (or at least should not be) a political office. The two-year cycle encourages turnover and makes it difficult to build and retain well-qualified assessors. Although it would require a constitutional amendment, preferably assessors would be appointed as they are in all or parts of approximately half of other states, the District of Columbia, and all of Canada. As a minimum, assessors should be elected to serve a four-year term.

One other deficiency of note is the failure in Arkansas (and in about one-third of other states) to provide for full disclosure of sales information at time of sale. Although documentary stamps are helpful in establishing the price paid, assessors or contractors must now contact parties to the transfer to obtain pertinent information regarding the circumstances and relevant particulars of the transaction (e.g., personal property and method of financing). This is time-consuming for all involved and often unsuccessful. About two-thirds of states provide for completion of a real property transfer declaration providing the relevant information as a prerequisite to recording the deed of sale. Such an approach would improve the information base available to assessors, contractors, and ACD alike, and reduce the amount of contact required subsequent to the sale.

## **2.6 ACD Rules**

As seen, statutes provide ACD with clear authority to promulgate rules for reappraisals, performance standards, and the transfer of information to the Department. Current rules, which carry an effective date of March 3, 2002, cover such subjects as requirements of

appraisal managers and reappraisal plans, funding and budget approval, neighborhood delineation, reappraisal progress reports, monitoring reappraisals, and disbursement of payments from the Arkansas reappraisal fund. Interestingly, rules require that each county maintain a CAMA system (rule 3.34) but provide no specifications for such systems. Commendably, ACD is currently working on the development of such specifications. The specifications should provide for an automated comparable sales comparison approach, including multiple regression analysis (MRA).

Perhaps the most detailed (and laudable) rules relate to the conduct of reappraisal performance audits. Reappraisal managers must ensure that sales data for all warranty deeds are entered into the county's CAMA system. "The appraisal manager will assure that a reasonable attempt is made to obtain sales price and confirm validity of all warranty deeds" (rule 3.25). Property record cards must contain specified elements and must meet specified standards of accuracy. For example, perimeter measurements must be accurate to within one foot and data errors and omissions (including measurement errors) must not exceed 5%. The rules distinguish between phase 1 and phase 2 work: phase 1 relates to data collection, review, and entry, while phase 2 relates to valuation. Phase 1 work must not fall behind schedules set forth in the reappraisal plan by more than 10%. At least 50% of phase 2 work must be completed by April 19 of the valuation year. Ownership changes must be processed within 30 days of deed recording. Failure to achieve requirements results in withholding of reappraisal payments until the deficiencies are addressed and corrected.

Although appraisal managers must maintain neighborhood maps and a narrative description of neighborhood boundary lines, no criteria or guidance are provided for delineating neighborhoods. Nor do rules provide guidance for the development of market areas. Market areas are groupings of economically similar (and usually contiguous) neighborhoods that are useful for organizing reappraisal work, creating valuation models, and performance monitoring. They have become widely accepted as an important element of a modern mass appraisal program.

Current rules (specifically rule 3.48) provide for funding actual costs of reappraisal up to a maximum of \$7 per parcel per year where a full reappraisal, including measurement of all parcels, is conducted in accordance with ACD rules and guidelines.

Rule 4.04 addresses ratio study performance standards. Unfortunately rule 4.04 is not sufficiently clear in places and contains prolific references to obsolete provisions (such as the weighted coefficient of dispersion and the 1990 IAAO *Standard on Ratio Studies*, now superseded by the 1999 Standard). The most notable provisions are as follow:

- Four property classifications will be studied: (1) real property appraised at market value, (2) agricultural property appraised on the basis of productivity value, (3) business personal property, and (4) automobiles and other personal property. One must read rule 4.04 in its entirety to understand these four components; introductory section I of the rule does not clearly identify them. (Recall that only category 1 is the subject of this review.)

- The Department will compute an “overall ratio” by weighting the ratio computed for each of the above classifications by the estimated market value of each. This follows IAAO standards. However, in seeming contradiction to Act 1185 and related statutes, as well as the purpose of its ratio studies as set forth in section IA of Rule 4.04.1, ACD does not require counties to achieve required standards (18% to 22%) *within* the various classes comprising the real property component (#1 above). Thus, real property classes (residential, commercial, etc.) could be appraised at very different percentages of market value as long as the overall or average level was between .18 and .22.
- Burden of proof for determining compliance with the 18-22% standard for the level of appraisal is on the Department. This would appear to imply use of confidence intervals, consistent with IAAO standards.
- Aggrieved counties can appeal the Department’s determinations initially to the ratio study coordinator and then to the Director of ACD.
- Up to three years of sales may be used in the ratio study of real property appraised at market value. The rule describes procedures for drawing a random sample of sales from county deed books sufficient to obtain adequate sample sizes for statistical analyses. These procedures are now obsolete in the wake of both legislative changes and improved procedures of the Department for using all valid sales and should be revised.
- Designated types of transactions shall be coded as invalid and excluded from ratio studies. The listed transactions are consistent with IAAO standards except that sales involving a financial institution should be viewed with caution rather than excluded automatically. These sales can represent market value and be can used in ratio studies when the financial institution buys property for its own use or when it sells properties it has acquired (through repossession) on the open market at the highest obtainable price (*IAAO Standard on Ratio Studies*, 6.4.1).
- Sales prices are to be adjusted only for the value of any personal property included in the sale price. This rules out adjustments for atypical financing and time of sale. While atypical financing can be handled by excluding rather than adjusting the sale (at least in today’s market where financing terms generally don’t require cash equivalency adjustments), time-adjustments are mandatory when using multiple years of sales in an inflationary (or deflationary) market. This curious limitation stands in direct contradiction to IAAO standards and should be rethought. Happily, such adjustments are more easily made when working with all valid sales rather than smaller, random samples.
- Counties can object to ACD’s determination of whether individual sales are valid for ratio studies by stating the basis for objection and providing required documentation.

Such objections and supporting documentation must be filed by May 31. No deletions shall be made after July 31.

Notably absent from the rules is any reference to requirements for appraisal uniformity, as appears to be called for in Act 1185. This and other deficiencies and opportunities for improvement will be discussed at the appropriate time in subsequent sections. For now, it can be noted that ACD's rules relating to ratio studies (rule 4.04) should be rewritten to conform to new legislation and procedures, to reference current IAAO standards and texts, to provide improved clarification, and to address a number of areas highlighted elsewhere in the report.

## **2.7 Staffing of ACD**

The ACD director is assisted by a deputy director, attorney, office administrator, education/research coordinator, fiscal manager, ratio study coordinator, and manager of field operations. In all, the department consists of 32 positions, including 20 field operations staff, who supervise reappraisals and coordinate preparation of data for the ratio study in each county. The most glaring deficiency, which will be exacerbated in the transition to inclusion of all valid sales and related mass processing, is a dearth of technical positions with statistical and data analysis skills. Aside from one aide, the ratio study manager has virtually no assistance in processing and analyzing data received from the counties.

Going forward, the Department will need to develop additional skills in data analysis and statistical methods. At least two new positions in this area are needed.

## **3. Role of Ratio Studies**

This section provides an overview of ratio studies and commentary on how the Arkansas studies compare with the general IAAO model. Specific technical issues are addressed in the following two sections.

### **3.1 Overview of Ratio Studies**

Ratio studies are the principle tool for objectively analyzing assessment performance. They compare assessments made for tax purposes against recent sales or (less frequently) appraisals made by an independent party or agency, generally a property tax supervisory agency. A ratio study that compares assessments with sales is termed a "sales ratio" study. A study that compares assessments with independent appraisals is termed an "appraisal ratio" study. Some studies, including the Arkansas study, generally rely on sales but supplements sales with appraisals as required to obtain statistically reliable samples.

Ratio studies are used first and foremost to monitor appraisal performance at the local (county) level. Arkansas assessors and contractors can use ratio studies to determine the level of assessment for various classes and neighborhoods, determine measures of uniformity, and in general study to ensure that properties are appraised accurately and uniformly in each class and subgroup of properties.

Almost all states maintain standards of acceptable appraisal performance and conduct ratio studies to monitor the degree of compliance. Appeal and equalization boards can use ratio studies to determine equity within and among various classes of property. Property owners (or their representatives) can use ratio studies to determine whether their properties are assessed fairly and consistently with other properties.

### **3.2 Aspects of Appraisal Performance**

There are two principle aspects of assessment performance: level and uniformity. Level refers to the overall or “average” ratio at which a county, class, neighborhood, or other group of properties is assessed. IAAO standards call for an appraisal level of .90 to 1.10, which in Arkansas’ fractional assessment systems implies a level of assessment of .18 to .22. Arkansas statutes specifically codify the requirement.

At least three measures of central tendency are used to measure assessment level:

- Median ratio. The median represents the midpoint of the ratios and has the desirable feature that it is little affected by very low or high ratios (“outliers”).
- Mean ratio. The mean is the simple average of the ratios. Because it is affected by outliers and has no significant advantages, the mean is often calculated but rarely used for equalization.
- Weighted mean (“aggregate”) ratio. The weighted mean weights each ratio on the basis of its sale price and, as such, is conceptually preferred for estimating the full market value of a property group. However, the measure is sensitive to outliers. This is the primary measure used by ACD in its studies.

Appraisal uniformity refers to the degree of equity among property owners. Achievement of an overall appraisal ratio of 100% (assessment level of 20%) does little good if some properties are appraised at, say, 150% of market value, while others are appraised at only two-thirds of market value. There are at least three facets of appraisal uniformity:

- Uniformity among classes and other property groups. This can be evaluated by comparing measures of central tendency for each group. According to IAAO standards, measures of central tendency should be within 5% of one another.
- Equity among individual properties. The preeminent measure of assessment uniformity is the *coefficient of dispersion* (COD). It measures the average percentage deviation from the median ratio. For example, a COD of 14.5 would

mean that individual ratios differ, on average, by 14.5% from the median ratio. Low CODs imply equitable assessments. IAAO Standards call for CODs of no more than 10-15 for residential properties (depending on age and homogeneity), no more than 15-20 for commercial properties, and no more than 20 for vacant land.

- Equity across value ranges. Assessment ratios should be uniform between lower and higher-value properties. The relative over-valuation of lower-value properties is known as assessment regressivity and the relative over-valuation of higher-value properties is known as assessment progressivity. The most common measure of price-related equity is the price-related differential (PRD), which is calculated by dividing the unweighted mean ratio by the weighted mean ratio. Aside from the issue of outliers (which can distort the PRD), the closer the PRD is to 1.00, the more equitable the assessments. Even small departures can signify significant problems. IAAO standards call for PRDs of .98 to 1.03.

### **3.3 Direct and Indirect Equalization**

There are two major forms of equalization. Direct equalization involves changes to the assessed values that appear on valuation notices. In effect, if a state equalization or oversight body, such as ACD, finds assessment levels to be unacceptable, it orders changes to be made.

In indirect equalization, the state agency adjusts assessed values on paper only. Many states exercise indirect equalization for purposes of estimating the total market value of school districts for purposes of aid distributions. Districts with lower equalized value per pupil receive more aid than wealthier districts.

Arkansas conducts only direct equalization studies. In general, states (like Arkansas) that rely only on direct equalization need to be more vigilant in enforcing valuation standards than those who compensate for local disparities through indirect equalization. If direct equalization is not effective, school aid will not be properly distributed and disparities will persist between taxpayers in taxing districts in which properties are assessed at varying percentages of market value.

### **3.4 Steps in Ratio Studies**

The IAAO Standard on Ratio Studies (1999) identifies six major steps in any ratio study:

- Definition of purpose and objectives. In Arkansas the primary purpose of the ratio study is to measure assessment performance during county revaluations and ensure that assessment level requirements are met. As mentioned, if results are found inadequate, adjustments will be ordered (direct equalization) and funding potentially withheld until the deficiencies are corrected.
- Collection and preparation of data. As described, in the past ACD staff selected a random sample of sold properties, obtained sales prices from county deed books, and

contacted parties to the sale to help determine the usability of the transfer for ratio study purposes. Sales lists were provided to counties, who had the opportunity to review them and request adjustments. In the future, ACD plans to use all valid sales over at least a one-year period in its studies. Although this has important advantages (to be discussed more fully) of increasing sample size and representivity, ACD will be hard pressed to research and verify all such sales rather than the smaller samples used in the past. Consideration should be given to verifying or auditing sales codes assigned by assessors and contractors rather than duplicating the function (see section 4).

- Matching appraisal data and market data. Sales data must be matched against values assigned to the same parcels for tax purposes. Although seemingly straightforward, one must ensure that the sale price and value reflect the same physical status. For example, if a property owner buys a vacant land and constructs a building, the sale price will reflect only the land while the assessed value may reflect a completed improvement. Such sales must be excluded from the study. If the sale includes two or more properties, the assessed values of the properties must be summed and compared with the sale price (ACD does so).

In the past, ACD staff manually extracted values for sample properties from the preliminary (prior year) and final (revaluation year) abstracts submitted by the counties. In the future, this will be prohibitively time-consuming and ACD will need to electronically match values from assessment abstracts against sales (some counties and contractors already supply data in a suitable format).

To complete its studies in a timely manner, ACD needs to receive values early enough so as to allow sufficient time for processing and analysis. Interestingly, the only date specified in statute related to the final ratio study is that it be completed by August 1. ACD needs to specify by rule when the values and related files required for the calculations are supplied to the Department. At least 45 days of lead-time should be provided. To avoid compressing the assessment calendar, it appears that the August 1 could be legislatively revised to September 1 without unduly impacting subsequent deadlines.

- Stratification. Stratification is the important process of dividing properties into groups based on property type, geographic location, or other criteria. Stratification permits one to compare assessment levels among strata and also potentially to compute the overall real property ratio as a weighted average of results for the individual strata.

Currently ACD stratifies real property appraised on a market value basis into four groups: (1) urban residential, (2) rural residential, (3) suburban, and (4) commercial and industrial. These strata are used for reporting purposes only; they are not weighted into an overall ratio. Instead, the overall ratio is computed as the weighted mean (aggregate ratio) of the pooled sample of sales. We will address stratification more critically in section 5.

- Statistical Analysis. This involves computing the various measures of central tendency and uniformity mentioned earlier. Many states also compute *confidence intervals* about the measures of central tendency. Confidence intervals indicate whether one can statistically conclude that a given standard (e.g., an assessment level of .18 to .22) has not been met. They are particularly useful when samples are small, since measures of central tendency could fall outside of requirements simply due to chance (“sampling error”). Currently ACD does not use confidence intervals.
- Evaluation and Use of Results. Although ratio studies are powerful tools, good judgment is required in their proper interpretation and use. Sometimes the results are conclusive but often they are not (particularly when samples are small). ACD’s initiative to use all valid sales is an attempt to expand samples and thus the confidence that can be placed in results.

#### **4. Data Assembly and Sales Validation**

As discussed, in the past ACD selected sales samples and field staff contacted parties to the transfer to help determine the validity of each sale. Counties could review these determinations and request changes. These procedures are no longer applicable since ACD will be relying on sales files obtained from the counties.

Because it is not feasible for ACD to independently investigate all sales (and because such duplication of the same function by two government agencies or their contractors does not make sense in any case), ACD must pursue a new approach. Three possibilities arise: (1) ACD can use codes supplied by the counties, (2) ACD can electronically screen sales, and (3) ACD can pursue some combination of these two approaches.

##### **4.1 Use of Assessor-Assigned Sale Validation Codes**

A number of states rely on sales validation codes assigned by assessors. In full disclosure states, state personnel often evaluate sales validation codes based on the information supplied on sale disclosure forms and change or question codes that appear unsupported or unjustified. Some states independently verify a random sample of sales and accept assessor-assigned codes as long as the “error” rate between local and state-assigned codes does not exceed some threshold (e.g., 10%).

Unfortunately, this approach is problematic because Arkansas is not a full disclosure state and because currently ACD does not maintain a set of sale validation codes that would indicate why a sale is being rejected (e.g., transfer between related parties, sale of partial interest, etc.). States with such codes can monitor whether they are being overused or otherwise abused.

## **4.2 Electronic Validation**

Electronic validation is the process of screening sales statistically. Sales are regarded as usable, representative transfers as long as they do not fail certain statistical edits based on price or price per-unit depending on property type and other criteria and as long as the assessment-to-sales ratio falls within certain parameters. The ACD ratio coordinator has already developed edits to remove prior sales of the same parcel, multiple parcel sales (presumably because of problems in aggregating the assessed values), and parcels with unusual prices or ratios.

Electronic edits have the advantage of being objective and even-handed. However, if used in isolation, they ignore the county validation efforts and would lead invariably to conflicts when assessors or contractors coded them one way based on Department guidelines and the Department coded them another way based on standard algorithms. In addition, effective electronic edits require data on key property characteristics, such as size, age, and construction quality so that one can look for atypical prices within relatively homogeneous strata.

## **4.3 Recommendations for Sales Validation**

The Department should take advantage of sales validation efforts made by the counties and their contractors and use the assigned codes as long as they are correctly assigned and pass routine audits. Unfortunately, as mentioned, this is relatively difficult since the ACD has not established a set of validation codes that can be monitored and checked. The ACD should develop such a set of codes and require that they be assigned on sales files provided by counties as of a designated point in time. In the meantime (2004 and perhaps 2005 reappraisals), the Department can monitor the percentage of sales coded as invalid by property type within each county and conduct a random audit of (a) sales coded usable and (b) sales coded unusable. Counties invalidating an abnormally high percentage of sales for a given property class should be subject to additional scrutiny. In addition to the usual withholding of payments for unacceptable work, if it is found that a county or its contractor has not properly verified sales, ACD should perform the screening process itself (or hire another contractor to do it). If the county is large and this would prove overly burdensome, then ACD can select a random sample of sales and conduct a ratio study for the smaller sample of sales as it did in the past or rely on electronic screening supplemented by routine procedural audits.

In addition, ACD should pursue and refine its electronic validation programs. Unfortunately the method of identifying outliers based on the inter-quartile range presented in the IAAO *Standard on Ratio Studies* (1999) tends to exclude mostly high ratios and few low ratios. Currently ACD partially compensates for this by filtering high value sales (which tend to have low ratios). However, the lowest ratios are not confined to the highest sales prices and setting cut points too low tends to truncate representivity at the higher end of the market. While outlier high-value sales should continue to be excluded because of their leverage impact on the weighted mean, the IAAO inter-quartile range method could be modified to produce a more symmetrical trim. Perhaps the best

(and easiest) way to accomplish this is to take the natural logarithms of the ratios, which produces a more symmetric distribution, and then filter using the inter-quartile range method. Once outliers are removed, the analysis can proceed in the usual manner.

Consideration should also be given to automatically excluding properties that fall in the lowest 5% or 10% of assessed value within each class of property. These properties are invariably difficult to analyze and appraise, are characterized by volatile prices with widely varying ratios, and constitute only a trivial percentage of value (likely, less than 1 or 2%) for their class. Removing them would result in a cleaner study.

If possible, multiple parcel sales should be retained (at least for commercial properties) by summing their assessed values.

#### **4.4 Electronic Transmission of Assessment Files**

Although the discussion in this section has thus far focused on sales data, going forward it is imperative that ACD receive relatively complete property data from assessors or their contractors. In addition to sales data and accompanying sales validation/rejection codes, ACD must have data on proposed and prior values, property type code (termed “P” codes), location (preferably market area and neighborhood), and selected property characteristics, such as construction quality, year built, lot size, living area, and other key value contributors. These data will potentially serve many purposes: electronic sales screening, stratification, time trend analysis, tests for selective appraisal of sold properties (see section 5), and reappraisal monitoring. As just one example, data on year built will permit a comparison of sale year and construction year and enable the ACD to analyze the reasonability or depreciation schedules being used in reappraisal projects (if ratios trend systematically upward or downward with age, depreciation schedules may not reflect the local market).

ACD will need to receive or convert these data to a common format. Since there are only two primary contractors in the state, both of whom have worked constructively with ACD in the past, this should be comparatively straightforward. Perhaps the required fields could be specified in the CAMA systems requirements now being developed by ACD in consultation with assessors and contractors.

### **5. Technical Issues**

There are a number of important technical issues in ratio studies, most of which are common to all such studies. This section discusses and makes recommendations for the more important of these in Arkansas.

#### **5.1 Sample Size and Representativeness**

The reliability of any ratio study begins the adequacy of the data used in the study. The single largest criticism of past studies was the selection and representativeness of sales

used in the study. ACD's initiative to use all valid sales is designed to address these concerns. However, there will still be many instances in which the number of sales occurring in a one-year period is inadequate for statistical reliability. How many years of sales should be used in studies?

The adequacy of sales can be expected to vary greatly between small and large counties. In smaller counties assessors or contractors need to use at least two or three years of sales in a reappraisal. In large counties only one year of sales may suffice, although many practitioners prefer more, and two or more years may well be required for commercial properties. In any case, ACD will need to formulate rules specifying how many years of sales counties need to validate and submit to the Department. The following criteria are suggested:

- Residential improved property and vacant land - one year of sales in "large" counties (e.g., those with at least 50,000 total parcels) and two years of sales in all other counties.
- Commercial and industrial property - one or two years of sales in "large counties" and three years in all other counties (one year of sales has the advantage of minimizing the need for time adjustments, while two or more years provides larger samples and makes time adjustments easier).

Alternatively, two years of residential sales and three years of commercial sales could be used consistently for all counties (this is Nebraska's approach). Much will depend on current reappraisal practice and guidelines (with certain caveats, as long as sales are screened and used for reappraisal, they can - and should - be used for ratio studies as well).

## **5.2 Time Adjustments**

According to the *IAAO Standard on Ratio Studies* (1999, section 6.5), sales should be adjusted "for differences in market value levels between the date of sale and the date of analysis." In Arkansas this implies that sales should be adjusted to January 1 of the reappraisal year. Failure to apply time-adjustments results in calculation and acceptance of biased assessment levels. In an inflationary market, measures of central tendency will be biased downward; in a deflating market, they will be biased upward. Of course, the longer the time frame for sales used in the study, the more important time adjustments become. While time-adjustments may be of only marginal importance when one year of sales is used, they can be very important when two or three years are used. In the interest of consistency among counties and property types, all sales should be adjusted (by quarter or month) to the reappraisal date of January 1.

As part of market analysis, contractors should develop time adjustments during reappraisal. It is recommended that the Department regularly study time trends in reappraisal counties but stand ready to utilize adjustments developed by counties where properly done and consistent with the Department's own results. A table should be

defined to store and apply time-adjustments by property type and, preferably, market area. The IAAO literature contains explanations of time adjustment techniques (see particularly, *Mass Appraisal of Real Property*, 1999, pages 263-270). Of course, staff will have to develop proficiency in the required analyses. If necessary, this enhancement could be targeted for the 2005 or 2006 studies.

It is recommended that ACD divide the State into economic regions (the delta, the mountains, etc.) for purposes of time analyses when samples are otherwise inadequate. This would be most helpful in the case of commercial properties.

### **5.3 Stratification**

As discussed in 3.4, stratification is one of the essential steps in a ratio study. Recall that the Department currently stratifies real properties appraised on a market value basis into four groups for ratio study purposes: (1) urban residential, (2) rural residential, (3) suburban, and (4) commercial/industrial. However, while separate ratio statistics are calculated for each of these groups, only the pooled ratio (without stratification) is used for roll evaluation.

The chosen strata are unique to Arkansas (no other state uses the same classes). Note that three of the classes are residential and that each designation spans the entire county. While these categories are adequate for the moment, in the long run a preferable approach would be to separate residential properties into "market areas" as discussed in 2.6. A small county might have a single market area, while a large county may have six to ten.

Note also that vacant land and multi-family properties are not broken out as separate classes (apartments with 5+ units are included in the commercial and industrial category). In fact, vacant land seems to be particularly problematic in ACD's studies. Because of problems associated with changes of use and absorption discounts, vacant land sales were not used in initial research related to implementation of the new methodology. Still, vacant land accounts for many sales and a significant percentage of value in many counties. Although vacant land sales can be volatile and do raise specific problems, counties need to screen them for reappraisal purposes just like other sales. Provided that they have been screened in accordance with ACD guidelines and survive electronic edits, vacant land sales should be used in ratio studies just like any other arm's-length sale.

### **5.4 Interpretation and Enforcement of Level Standards**

While Act 1185 and related statutes, as well as IAAO standards, call for uniformity among classes of property, ACD currently only requires that the aggregate ratio calculated from the pooled sample of all four real property classes falls between .18 and .22. The failure to enforce equity among generic property categories (most notably residential, commercial, and vacant) departs too far from IAAO standards, and seemingly from statutory requirements as well. Beginning for the 2005 revaluations, it is recommended that ACD adopt rules requiring that the .18 to .22 standard be met

separately for (a) improved residential properties, (b) improved commercial and industrial properties, (c) vacant land (including land with only minor improvements).

To guard against the possibility of sampling errors for relatively small samples (e.g., a ratio of .175 based on 25 sales), confidence intervals should be used for purposes of determining compliance with the .18 to .22 standard at the property class level (not for the overall countywide ratio). That is, a computed assessment level outside the window would not be viewed as constituting noncompliance unless the departure was statistically significant at the 90% confidence level (“two-tailed” test implying 5% tolerance on each side of the distribution). If adopted, similar analyses could be conducted at the market area level to ensure that each geographic grouping of residential property was fairly appraised.

The standard of .18 to .22 should continue to be enforced for the overall countywide ratio. However, per IAAO standards, the overall ratio should be computed as a weighted average of the results for the various real property strata. Thus, for example, if commercial/industrial properties constitute 28% of total estimated market value, they would receive 28% weight in calculation of the overall ratio. A complication is that the current abstracts do not break out assessed value by the same categories as ratio studies (instead, commercial and industrial properties are included with urban, rural, and urban). Although it will not be possible to resolve this problem for 2004, in future years counties should be required to separate commercial properties on abstracts. Alternatively, the appropriate subtotals can be calculated from property type codes provided on electronic submissions.

## **5.5 High-Value Properties**

A special problem in ratio studies is high-value properties that constitute a significant percentage of the value of a class of property or even of an entire county. Examples could be a major manufacturing plant or sawmill. Happily this is more of a problem in “indirect” equalization, where the objective is to estimate total market value, than in direct equalization where the objective is to measure assessment performance. It is recommended that properties that constitute more than 5% of the assessed value of a class of property be automatically excluded from the study (this can be viewed as the flip side of an earlier recommendation to automatically exclude the lowest value properties). Thus, a sale of such a property would not be used (it would be filtered as an outlier based on its high price in any case) and these properties would be excluded in determining the total market value and thus weight to assign to each class of property when calculating the overall assessment ratio of the county.

The proper assessment of high-value properties is better addressed in procedural reviews. These properties rarely sell and can distort the weight assigned to a property class in determining overall performance for the county.

## 5.6 Uniformity Standards

To date ACD has not adopted rules relating to uniformity standards, although such statistics are calculated in the course of monitoring reappraisals, as well as by counties and contractors. To ensure uniformity, the ACD should adopt minimum standards for at least the coefficient of dispersion (COD). Initially, it is recommended that these requirements allow a disparity of 5 percentage points about IAAO standards. Thus, the following standards are recommended:

- Residential property - less than 15% to 20% depending on the age and homogeneity of properties. The tighter standard could be applied to larger counties with more sales and a greater percentage of urban properties.
- Commercial properties - 20% to 25%. Again, the tighter standard could be applied in the larger counties.
- Vacant land - 25%.

Tighter standards can be considered once experience is gained with the new methodology and ratio study results.

## 5.7 Selective Appraisal of Sold Properties

Assessment oversight agencies must be vigilant in guarding against the unprofessional practice known as “sales chasing” in which values for sold properties are set near the sale price, while values for unsold properties are set at lesser amounts. The IAAO literature describes a number of techniques for detecting sales chasing (see particularly *Mass Appraisal of Real Property*, 1999, pages 309-316). Of these, perhaps the simplest and most effective is to track percentage changes in values for sold and unsold properties. For example, if values for sold properties were increased by 25% on average, while values for unsold properties were increased by only 10%, sales chasing is indicated (statistical tests can be used to confirm that the difference is statistically significant). Such analyses require access to the full assessment roll, not only to compute average percentage changes for both sold and unsold properties, but also to stratify properties by type and/or geographic area to ensure that “hot-spots” are not disproportionately represented.

If sales chasing is detected, ACD should take firm action to withhold payments until the disparities are corrected or contract with an alternative party to complete the reappraisal.

## 6. Summary of Recommendations

1. The 5% and 10% limits on value increases should be stricken. The increases are administratively burdensome, create added time and cost, and favor better-situated properties over those whose values have risen less rapidly. In effect, the provision imposes additional work and cost, creates valuation inequities, and redistributes taxes in a regressive manner. Unfortunately, since the limits were imposed by constitutional amendment, they would prove difficult to undo.
2. The 20% assessment ratio should be removed. The factor plays no useful function and can only potentially confuse property owners in evaluating the accuracy and equity of their values. Concurrent with its removal, tax rates should be cut by 80%.
3. The ACD should commission a review of its procedural audit program. An independent study would bring the opportunity both to examine past practices and to consider new, more effective or efficient approaches. The study should seek the input of the ACD, counties, and contractors alike and, where possible, recommend improved means of accomplishing the important objectives of the program.
4. The General Assembly should give consideration to providing for annual updates between revaluation years. This would not only provide for more up-to-date and accurate values, but would encourage on-going tracking of the local market and the retention of full-time professional mass appraisal staff.
5. Assessors should be appointed or elected to four-year terms. Appointing assessors helps ensure relevant qualifications and experience. A term of only two-years promotes quick turnover and makes it difficult to build and retain qualified, experienced assessors. The assessor's office is a complex, apolitical job requiring varied and specific knowledge and skills. Making the office an appointed position or, as a minimum, changing the term to four years would improve the ability to attract and retain experienced, qualified assessors.
6. The General Assembly should provide for "full disclosure" of sales information at time of sale. This information would improve and simplify assessment administration across the State and reduce the amount of subsequent contact required with parties to the transfer. Such information would also be highly useful to private appraisers, as well as to other government and private entities that make use of real estate prices.
7. ACD should be allocated at least two additional technical positions for data and statistical analyses related to the ratio study. The integrity of the entire ratio study and equalization process depends on sound, thorough data analysis. Data received from the counties must be analyzed for representivity and a number of statistical analyses must be conducted, and supported as necessary, to determine

whether valuation requirements are truly being achieved. At least two new data analyst/statistical positions are needed to conduct (and defend) such analyses.

8. Rules relating to ratio studies and equalization methodology (rule 4.04) should be overhauled. Rule 4.04 is outdated, sometimes unclear, and in general needs to be revised and strengthened, particularly in view of new initiatives being introduced by the Department for use of all valid sales over the study time frame.
9. Rules and guidelines should provide criteria for delineating market areas and neighborhoods. Market areas, which are large geographic areas of a county subject to similar economic influences, are an integral part of both mass appraisal and assessment measurement programs, particularly for residential properties in larger counties where values can vary considerably from one part of the county to another. Criteria or guidelines based on parcel counts (and thus expected sales) can help ensure that adequate sales will be available for both appraisal and performance measurement purposes. Assessors and contractors should transmit market area codes to the ACD as part of the data transmittal process.
10. The State should continue its work to develop CAMA system specifications and requirements. The design and functionality of a CAMA system is crucial to accurate and efficient property assessments. Hopefully the specifications will provide for an automated sales comparison approach to value, including multiple regression analysis (current rules largely assume use of the cost approach).
11. By rule ACD should establish deadlines by which counties must transmit required data to the Department. It is imperative that ACD have reasonable time to process and analyze data supplied by counties, produce ratio studies, and review and act on results. At least 45 days of lead-time must be allowed for this purpose (it appears that the date for reporting results could be moved back one month to September 1 and hearings moved back as necessary without undue pressure on subsequent deadlines in the assessment/tax calendar).
12. The Department should rely primarily on county validation codes. Because it is impossible and inefficient for ACD to attempt to verify all sales and because assessors and contractors perform (or should perform) the same function in any case, the Department should instead focus on setting uniform guidelines and auditing the sales validation process.
13. The Department should develop a uniform set of sale validation/rejection codes consistent with IAAO standards. Rules should require counties to provide these codes on sales files routinely supplied to the Department. Although the codes would to a large extent formalize the various reasons for rejecting sales already contained in existing rules and guidelines, they would enable the Department to electronically monitor the sales validation process and facilitate random audits of assigned codes.

14. The Department should require electronic submission of data. The required data includes property type code, sales price and date, sale validation code, current and prior value, and various property characteristics. These data will greatly enhance the Department's analytical capabilities. The required items and format could be specified in rules or in CAMA system specification currently being developed (#10 above).
15. Unvalidated sales must be retained in ratio studies. To comply with IAAO standards and ensure fairness among counties, sales that assessors or contractors have failed to validate must be used in ratio studies provided they survive the electronic validation process.
16. The Department should continue its efforts to electronically validate sales. This will ensure that certain situations (e.g., repeat sales) and outliers are consistently handled.
17. The lowest and highest value properties should not be part of the ratio study. Consideration should be given to automatically excluding the lowest 5% or 10% of assessed values within each class. Sales prices for these properties are problematic (potentially distorting the COD) and, in any case, carry little weight in calculation of assessment levels. Similarly, properties constituting more than 5% of the assessed value of any class of property should be excluded both in calculating measure of assessment level and dispersion and in determining the appropriate weight to assign to each class of property in calculating the overall assessment level. Assessment performance for high value properties is better monitored through assessment procedural reviews.
18. The Department should develop rules for the period of sales to be used in its ratio studies (current rules only say that up to three years of sales can be used). The period should range up to three years in small counties. Contractors should be required to screen and submit sales for the specified time frame in their data transmittals to the Department.
19. Sales prices should be adjusted for time. This will make possible the addition of older sales and improve the representativeness and accuracy of studies. The Department should determine indicated adjustments but also stand ready to accept adjustments developed by counties if proper methods were used and the results are consistent with its own results. To allow the necessary analytical skills to be developed, this enhancement should be targeted for the 2005 or 2006 studies. Counties can be grouped by region for the analyses in order to increase sample sizes (particularly for commercial properties).

For purposes of accuracy and consistency, all sales should be adjusted to January 1 of the appraisal year regardless of the number of years of sales used in the study.

20. Assessment level standards should be separately enforced for residential properties, commercial and industrial properties, and vacant land. Both Arkansas statutes and IAAO standards call for equity among major property classes, which can only be achieved if each class falls within the .18 to .22 standard. Confidence intervals can be used to guard against sampling errors when sample sizes are comparatively small (e.g., commercial property in the smaller counties).
21. The overall ratio should be computed as a weighted average of the ratios for each subclass of real property. This is in accordance with IAAO standards and ensures that each class is represented in the calculation in proportion to its estimated market value. Properties that constitute more than 5% of the assessed value of a property class should be excluded for this purpose (see #17 above). In contrast, the current overall ratio is calculated from the pooled sample of sales.
22. ACD should develop COD standards. This will focus greater attention on assessment uniformity and ensure that appraisals are reasonably fair among individual properties. Initially such standards could be set at IAAO standards plus 5% (e.g., a standard of 15% to 20% for residential properties). Once experience is gained and results from the new methodology reviewed, ACD can consider specifying and enforcing tighter standards.
23. The ACD should implement statistical tests for the selective reappraisal of sold properties. In the past, if it suspected sales chasing, ACD would compare values for sold properties with surrounding unsold properties. This effective but labor-intensive practice is no longer practical given that all valid sales will be used in future studies. A simple, easily automated alternative approach is to compare average value changes for sold and unsold properties of the same type in the same market area or neighborhood. If “sales chasing” is detected, firm action should be taken.