ANALYSIS OF FULTON COUNTY BOARD OF ASSESSORS PROPERTY TAX SYSTEM

Prepared for

FULTON COUNTY BOARD OF ASSESSORS

By

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Contents

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EXECUTIVE SUMMARY

In the wake of controversy, the Fulton County Board of Assessors selected Almy, Gloudemans, Jacobs & Denne (AGJD) to review the County's property tax system and the operations of the Assessment Department. The review was to identify property tax system strengths and to recommend improvements in strategy, policy, organization and processes that would result in process efficiencies (increased productivity), more accurate information, and improved service.

There is a temptation in a review of this nature to focus more remaining areas of need than on longstanding strengths and on recent improvements. It also is easy to overlook both the intrinsic difficulties in assessing property in a large urban district like Fulton County and the constraints imposed on assessing officials by others. Yet if assessment operations are to be evaluated holistically, overarching property tax system features and constraints should not be ignored. Otherwise progress likely will be more difficult. Although the critical studies that preceded our review identified legitimate areas of concern, the one-sidedness of the evaluations provided a weak foundation for making needed improvements in practices and performance. We hope to build on the strengths of the Assessment Department by laying out concrete suggestions for making improvements. At the same time, we identify areas of concern that are outside the control of the Department.

As is widely appreciated, the recent crisis did not arise overnight. It had roots in longstanding and some would say anachronistic features of the Georgia property tax system, a practice of infrequent reassessments, and a concomitant reliance on consultants.

A longstanding systemic issue is the diffuse sharing of responsibility for assessment administration in each county in Georgia. The elected tax commissioner, a board of assessors appointed by the county commission, and a chief appraiser appointed by the board each have general statutory responsibilities that must be worked out in practice. Especially when there is frequent turnover, such a setting makes it difficult to ensure continuity of vision and purpose. Happily, the current board of assessors has united and has appointed a new chief appraiser and assistant chief appraiser with the vision and skills needed to bring about needed improvements in operational effectiveness and efficiency.

We found that the staff of the Assessment Department has competent and conscientious members. One management challenge, fully appreciated by the chief appraiser, is to infuse the entire staff with greater assiduousness. Another challenge is to ensure that the computer-assisted mass appraisal (CAMA) system helps rather than hinders the staff in achieving greater effectiveness and efficiency. There are several system needs, which the new "iasWorld" system at least partly satisfies: (1) the analytical tools needed to monitor markets, develop and maintain mass appraisal models, and evaluate appraisal accuracy; (2) an easily maintained and flexible system for applying the models to produce defensible value estimates; and (3) tools to assist in managing the flow of work and producing internally consistent management information (comprehensive statistics on workloads, backlogs, and productivity rates), The former CAMA system (the "MAS" system) contained valuation tables populated by long-departed consultants. The complex, overly detailed nature of the tables made it virtually impossible for the residential appraisal staff in par-

ticular to update them to reflect current market levels as the law requires. This led to the unfortunate practice of sometimes changing individual property characteristics (such as reclassifying the quality of construction) to obtain a value estimate that was closer to current market levels. Although intended to ensure that the county complied with the state's standards, this practice degraded the accuracy of the property characteristic database while producing a misleading picture of overall valuation accuracy. Accurate data are crucial to accurate valuation on a mass basis. In addition, the department has not had a program of inspecting all properties routinely to ensure that they are accurately described. Such canvasses are considered necessary to ensure that changes in structures as the result of new construction and the like are recorded. The need for such inspections can be mitigated by having effective systems for monitoring building permits, and the new chief appraiser has solicited the assistance of municipalities in reporting permits to the assessment department. Street-level photography and oblique aerial photography can also be used to monitor building activity. Although such photography is less expensive on a per-property basis than traditional manual inspections, the assessment department budget has not allowed for such photography to be maintained adequately.

Although we cannot conclude that the assessment department needs additional staff, it has staffing needs that may require recruiting specialists. In particular, we recommend the creation of a research and development unit to assist in monitoring market activity, updating valuation models, and evaluating valuation accuracy. The department needs to ensure that the appraisal staff has the requisite mass appraisal skills.

Regarding valuation accuracy, we systematically compared in-place appraisals to contemporaneous sales that were deemed to be bona fide indicators of market values. We found that property generally was under-valued, that improvements in valuation uniformity should be attainable, and that properties were not revalued impartially: recently sold properties tended to be revalued more frequently than properties that had not sold.

With the exception of commercial properties that are valued (appropriately) by the income capitalization approach, the current valuation system is overly reliant on the cost approach to value, which conflicts with best practices, particularly for residential properties. The cost tables that drive the system have not been updated at the detail-level, as opposed to the aggregate level, for an unacceptably long period of time. The lag in updating them is principally due to inflexibilities in the design of the system, which is oriented to applying mass appraisal models efficiently, rather than to developing such models or keeping them up to date. In some measure the updating problems appear also to reflect deficiencies in system training and support received.

Basic personal property assessment procedures are acceptable. The chief weakness of the current system is inadequate effort to ensure that potentially taxable personal properties are declared by their owners. A strength of the personal property assessment program is the audit program, which helps to ensure that personal property is accurately declared.

Although procedures for handling appeals to the Board of Assessors could be more efficient, the volume of appeals has not been exceptional despite the clouds the assessments have been under and the fact that, in comparison to the situation in many other jurisdictions, the system is tilted in

favor of taxpayers. Going forward, more effective valuation procedures and better communication of assessment procedures should keep appeal workloads at a manageable level.

In summary, we commend the Board of Assessors and the chief appraiser for their commitment to making the Fulton County Assessment Department a paragon. Although many matters need to be resolved, we believe this goal is attainable.

1. INTRODUCTION

In the wake of controversy, the Fulton County Board of Assessors (BOA) selected Almy, Gloudemans, Jacobs & Denne (AGJD) to make a comprehensive evaluation of the operations of the Assessment Department. The aim of the evaluation is to identify property tax system strengths and to recommend improvements in strategy, policy, organization and processes that would result in process efficiencies (increased productivity), more accurate information, and improved service. The Board desired an "As-Is" analysis to serve as the basis for our recommendations—a "To-Be" redesign.

We made a systematic, structured analysis of the property tax system of the Fulton County Board of Assessors. The analysis considered the following twelve BOA requests in their larger systemic context.

1. Assist with defense of commercial, residential and personal property appeals. Improving the defensibility of these kinds of valuations is dealt with in sections 7 and 8 of our report.

2. Assist in developing residential and condominium models. Sections 6.3, 6.4, 7, and our mentoring activities described in Appendices A3 – A6 address these matters.

3. Assist in developing market and income models for apartment and commercial properties and provide modeling training. We discuss these matters in sections 6.5 and 7.5.

4. Evaluate the annual reassessment program, including its conformity with accepted principles. Sections 6.1 and 7 discuss these matters.

5. Evaluate sales ratio study performance standards and procedures. Section 3 is devoted to this topic.

6. Assist in establishing methods for developing trends in real property values and personal property values. Sections 6 and 7 discuss these matters and include recommendations for the development and timely refinement of more full-fledged valuation models in lieu of reliance on overly simplistic trending factors.

7. Evaluate data collection process. Section 5 is devoted to these issues.

8. Evaluate appeal review procedures. Section 10 is devoted to these issues

9. Evaluate current CAMA system and provide suggestions for enhancements. Sections 6 and 7, especially 7.3, discuss these matters.

10. Analyze workloads. Sections 2.4 and 4.2 deal with these matters.

11. Evaluate the methodology used to value leasehold improvement. Section 6.7 addresses this subject.

12. Identify any significant legislative or legal issues that would need to be addressed prior to implementation of other recommendations. Where findings cite deficiencies, provide recommendations to improve or remove the deficiencies. Section 11.2.1 summarizes our recommendations requiring changes in policy, including observations on any prerequisite changes.

Procedurally, we took a comprehensive approach to the engagement. We reviewed the legal framework within which assessment operations take place. We interviewed members of the BOA, both as constituted at the time of the engagement and as it was being reconstituted during our project. We interviewed cognizant personnel at oversight and collateral agencies, including the Georgia Department of Revenue and the county manager. We interviewed assessment office staff members at many levels including senior staff, appraisal personnel, and clerical support, observing work-flow patterns, system documentation, and actual procedures. We reviewed tens of thousands of pages of procedural and systems documentation. We obtained data files for multiple years of assessments, and analyzed them for the patterns they revealed about the quality of assessment performance and for the potential the data hold for the application of more modern methods of computer assisted mass appraisal (CAMA). In addition to observing the CAMA system that was in place at the start of our engagement, we reviewed the new system in test mode and discussed its capabilities in light of our knowledge of its use in other jurisdictions. We met a number of times with the chief appraiser and senior management, sharing our tentative conclusions and refining our approaches. As provided under the contract, we also began mentoring selected employees in the processes and benefits of adopting modern CAMA techniques. In our discussions with staff and our written report we have brought to bear not only what we learned locally, but also our knowledge of best practices in the field.

AGJD's partners have been fortunate to have contributed to much of the literature on best practices in assessment administration. This experience, together with our experience in other jurisdictions, provides the background we used in our evaluation of the Fulton County property tax systems. In particular, we drew upon the following publications of the International Association of Assessing Officers (IAAO): *Assessment Practices: Self-Evaluation Guide*, 2nd edition (2003), *Mass Appraisal of Real Property* (1999), *Property Appraisal and Assessment Administration* (1990) and *Improving Real Property Assessment: A Reference Manual* (1978), as well as relevant IAAO Standards. We also are conversant with standard 6 (mass appraisal) of the Uniform Standards of Professional Appraisal Practice.

2. SETTING

The political, fiscal, institutional, and economic setting of a property tax system influences its development and evolution. AGJD attempted to learn how such forces have influenced property tax administration in Fulton County.

2.1 Background

The quality of property tax administration in Fulton County has been a subject of controversy for more than fifteen years. There was an adverse public reaction to the 1991 revaluation, which delayed its implementation until 1993. Another revaluation was attempted in 1998. Subsequently, an attempt was made to move to annual valuation performed by a technically competent staff rather than relying on outside contractors. Questions about assessment performance were heightened in 2005 when an accounting firm, Cherry Bekaert & Holland, issued a damning performance audit. In April 2006, a performance review board convened by the Georgia Department of Revenue issued another damning report.

2.2 Legal Framework

Policies and procedures gain legitimacy through legislation. Consequently, a review of property tax legislation is necessary to understand institutional arrangements, identify legal requirements, identify areas of conflict between laws and practice, and identify conflicts between legislation and professional standards. This review also was necessary to fulfill our twelfth responsibility (as listed in section 1). Our policy and legislative recommendations can be found in section 11.2.1.

Property tax laws generally are found in Official Code of Georgia Annotated, volume 36, title 48, the Georgia Public Revenue Code. The code has chapter, article, and section subdivisions. The state's role is set out in chapter 2, and ad valorem property tax laws are found in chapter 5.

The code combines modern and antiquated features. Among the modern features are a clear market value standard of assessment. Values are required to be within ten percent of their mandated percent of market value, and assessed values are 40 percent of estimated market value[1]. A total revaluation, defined as revaluing more than 50 percent of all parcels, is required every three years (e.g., 2004, 2007). The state requires parties to a transfer of real estate to file a real estate transfer declaration, form PT-61, which is essential in a market value-based property tax. However, as discussed in section 5.1, the form is deficient.

[1] Staff reported that the internal target level of valuation was between 92 and 96 percent of market value. Translating from assessed value levels to market valuation levels, state oversight requires that each of four categories of property be valued at not less than 90 percent, and, under federal law, if the commercial ratio is at least 95 percent, then public utilities can be taxed upon the entirety of their estimated values rather than on whatever lower ratio is found for commercial property by the ratio study.

Among the antiquated features is the statutory requirement that taxpayers declare and value their properties in order to protect their right of appeal. Outside of a few New England states, boards of assessors are a rarity. Usually a single official (who may be appointed or elected) is unambiguously responsible for the assessment function.

The assessable status and valuation date is 1 January. Generally, sales in the prior year are used to establish values as of the valuation date. Thus, value estimates would tend to be conservative in a rising market. Taxes are levied later in the same year. That is, property taxes levied in March, 2007, and payable by November 15, 2007, are based on values as of 1 January 2007.

2.3 Fiscal and Institutional Framework

Fulton County has eleven established cities, including a large part of Atlanta, and a school district that levy property taxes.[2] The state levies a quarter mill tax. Countywide property taxes exceed $1.8 billion. The total estimated market value of the properties in the current assessment roll (digest) is in excess of $110 billion. As with many other assessment districts, the residential share of the total digest is increasing relative to the non-residential share, which is a source of political stress.[3]

2.3.1 Local Administration

Responsibility for property tax administration in Fulton County is divided between the Tax Commissioner and the Board of Assessors/Assessment Department (BOA). There is considerable overlap in the statutory duties of the two offices, making it necessary for the offices in each county to work out a precise delineation of responsibilities. In about 1998, responsibility for receiving taxpayer returns and for administering homestead exemptions was transferred from the Tax Commissioner to the Board. In simple terms, the BOA is responsible for listing and valuing assessable property, and the Tax Commissioner is responsible for property tax collection, including submitting the draft digest to the Department of Revenue (as discussed below).

The elected governing body of Fulton County, the Board of Commissioners, appoints the five-member, part-time BOA. The board, in turn, appoints a chief appraiser, "oversees" assessment operations, and serves as the first level of appeal (as discussed further in section 10). The chief appraiser administers the Assessment Department. The department receives administrative support from the County Manager (including office facilities, information technology support, legal assistance, press relations, budgeting, and human resources). The department also has been dependent on consultants to carry out revaluation exercises and for the nucleus of computer systems.

The cities furnish the Assessment Department with information about building permits. As discussed in section 5.2, neither transmittal procedures nor the information supplied are standar-

[2] The other established cities include Alpharetta, College Park, East Point, Fairburn, Hapeville, Mountain Park, Palmetto, Roswell, Sandy Springs, and Union City. Sandy Springs is new. In 2006, two additional cities Johns Creek and Milton were in the process of being formed.

[3] See for example the series of articles written for the Atlanta Journal Constitution by D.L. Bennett.

dized. The chief appraiser is asking cities to provide information on new business licenses (and on lapsed licenses).

A second level of appeal is to the County Board of Equalization (BOE). BOE consists of a number of three-member lay panels appointed by the County Grand Jury. BOE receives administrative support from the Clerk of the Superior Court. The Clerk also is the recorder of deeds. The third level of appeal is to the Superior Court. Many taxpayers rely on tax representatives to challenge assessments. It is said that five firms handle the majority of appeals.

2.3.2 State Supervision

Two state-level agencies are involved in property tax supervision in Georgia. The Georgia Department of Audits and Accounts (DAA) annually makes a sales ratio study that is used in equalization and the distribution of state school aid. The Local Government Services Division of the Georgia Department of Revenue (DOR) supervises local assessors in other ways. The commissioner of the Department must approve each county's annual property tax digest (assessment roll). If the digest is not approved, local property taxes cannot be levied, which is a Draconian enforcement tool. The digest approval process essentially is a desk audit (see section 9.2). However, DOR considers the results of the previous year's ratio study by DAA. Failure to meet the standards may result in the assessment of a penalty—an addition to the state levy. Fulton County has been subject to this penalty. In general revaluation years, a heightened review of assessment practices and performance is made. As it did in 2006, the DOR also may convene a performance review board (PRB) to review assessment practices in more detail than it does in the digest approval process.

2.3.3 Stakeholders

Taxpayers are, of course, important stakeholders. A number of groups represent them, including the Fulton County Taxpayers Association, which has been a vocal critic of the operations of the Assessment Department. Professional taxpayer representatives also could be said to be stakeholders.

2.4 Workload

Workload statistics are needed to express legal requirements in numerical terms, estimate resource requirements, and evaluate efficiency. Key work load indicators are: (1) the number of assessable real properties in each major property type; (2) the number of personal property accounts in each major category; and (3) the numbers of building permits, real property transfer documents, exemption applications, and the like that must be processed annually.

Despite having a system for monitoring productivity, detailed, consistently reported workload indicators are not readily available. However, Fulton County has a land area of 528.7 square miles. Its population was 816,000 residents in 2003. The total number of properties is variously reported as 288,000 and 313,000 (for comparison purposes, we use the 2006 digest total of 303,745). Of this total, we estimate that about 91 percent were residential and 7 percent were commercial or industrial. In addition, there are about 29,000 business personal property ac-

counts. The BOA also has to process about 50,000 deeds annually, of which about 20 percent require mapping changes. New construction and remodeling requires the reassessment of about 20,000 parcels annually. More than 10,000 appeals must be processed. In 2006, the Department issued 76,300 notices.

3. APPRAISAL ACCURACY

During our initial discussions with members of the Board of Assessors, several specific issues were raised, including the following:

- Does the county sales chase? There is a public impression it does.
- There is also a perception of inequities among neighborhoods.
- What are typical land/building ratios? There is a perception that land values are too low.

We attempted to address these issues, and others, in our review of extant quality control measures and our own analyses[4]. Section 3.4 discusses the "to-be" aspects of these issues.

3.1 Internal Studies

Fulton County staff quite properly generate reports of the assessment ratio study statistics that can be produced by the CAMA software available to them. Unfortunately, the inadequacies of that software impose severe constraints on what staff can do in this regard. Particularly troublesome is the inability of the software to calculate a median assessment-to-sales-price ratio. The median is an essential measure of assessment performance (see, for example, the IAAO *Standard on Ratio Studies*, 1999), and it forms the basis of the performance criteria to which Fulton County is subject and upon which it is evaluated by oversight agencies, including the Department of Revenue and the Department of Audits and Accounts. Consequently, the county has been unable to measure its own performance according to the most relevant criteria upon which it is being judged. This is an intolerable omission. The software is deficient in a number of other respects as well, including the necessary flexibility to analyze selected subsets of the total available data, the inability to produce relevant statistical/diagnostic graphics, and the inability to produce time-adjustment factors of greater acceptability and cogency than the plug factors now available[5].

Not only does the available software not support the necessary analyses, it also impedes the usage of other, external, software that has been successfully employed in other jurisdictions that have developed workarounds in the face of similar software deficiencies. The usual remedy, extracting the necessary data from the system and conducting the analyses using statistical software such as SPSS, is stymied here because the available mechanisms for extracting the data embed text messages for some records where crucial numeric data should be, making it impossible to read the data consistently without a lot of preprocessing. The data extracts also combine three different record types (or report types: detailed, group-summary, and final totals) into a single data set and interleave these sections, which so heightens the difficulty of extracting useful data that the effort is generally not undertaken. Possible remedies for this situation include using a data-cleaning program developed for this project and having the IT department modify the cur-

[4] The present section deals with the first two issues. Land valuation is discussed at greater length in section 6 below.
[5] As discussed at greater length below in section 6, the current software is far more focused on applying valuation models than on developing them. Thus there are provisions to plug time-adjustment factors into various reports, but no useful facilities to develop such adjustment factors in the first place, despite the need for them in connection with inflationary trends, changed land value patterns, and the like.

rent sales-extract program to suppress the summary records, which often lack summary identifiers and omit the median, as noted above.

Although short-term solutions exist, longer-term problems remain to be addressed. The main problems are that the standard extract program does not include all the data on property characteristics that an analyst would typically want, and it does not provide a way to differentially analyze properties that have and have not had changes made to their descriptive characteristics within certain time periods. The latter is an important part of detecting and adjusting for the pernicious assessment practice known colloquially as sales chasing[6]. That practice largely invalidates the results of assessment sales ratio studies because if the recorded characteristics and assessments of sold properties are changed in a way dissimilar to the pattern for unsold properties, the results of analyzing the sold properties will not be applicable to the majority of properties in the jurisdiction, which will not have been recently sold. Ideally an analyst would like to be able to review recorded property characteristics before and after the sale, but the characteristics at each of several year's end would also be useful. In Fulton County such data appear only to be available by obtaining annual extracts of the full CAMA file. Processing these data, however, presents further problems, inasmuch as the extracts we obtained contained undefined and illegal codes, including multiple "end-of-file" markers embedded in the middle of each file.

In short, the software currently available for monitoring appraisal performance is unacceptable and should be replaced immediately. A number of short-term work-around solutions are available, but in the longer term the assessment ratio study module (and in fact the whole CAMA package) needs to replaced, as the county is in the process of doing.

3.2 Oversight Studies

The annual sales ratio study conducted by the Department of Audits and Accounts, which is used by Department of Revenue's Local Government Services Division, is unexceptionable. As recommended by the IAAO *Standard on Ratio Studies*, it employs some, although minimal stratification. For locally assessed real property, the following stratification scheme is used: commercial, industrial, and residential, each further subdivided by vacant and improved. Although sales for only a single (calendar) year are used, the sample is augmented by appraisals of randomly selected properties for strata where the sales sample is clearly inadequate. Thus, it is not possible for local jurisdictions to anticipate perfectly what the findings of the study performed by the state will be, although for residential properties sales alone are generally used. The state's study does identify and provide limited descriptive detail on each sale in the study and each supplemental appraisal, and counties have an opportunity to contest whether any given sale represents an arm's length transaction and thus should be included in the study. The principal limitations of the state study are that it employs only rudimentary stratification, fails to calculate some of the statistics dictated by best practices, weights summary statistics on the basis of parcels rather than market

[6] Although the detection of sales chasing and the development of adjustments for it when it is found is normally associated more with ratio studies conducted by oversight agencies than with internal ones, the capability to detect it is important in both situations inasmuch as even internal executives will need to be able to detect, adjust for, and prevent deviations from quality standards.

values, and, most significantly, seems insensitive to the possibility of sales chasing (although we are informed that that may change).

3.3 Our Analyses

As part of our required "as-is" analyses, we investigated whether there was evidence for any of several common problems, including some that had been alleged by informed parties to have affected county practices. Sales chasing, which can contaminate attempts to use ratio studies effectively, was a high priority. Systematic under-appraisal of land was another issue. Inexplicable variability of assessment levels within a small neighborhood group was another issue, raised by the local newspaper[7]. We also explored whether there were other common problems such as inequities associated with building size, use, and age, which seemed especially likely given the problems the county faces in connection with keeping its estimates of replacement cost new (RCN) up to date. We based our analyses on both sales and property-characteristics data extracted from the CAMA files for 2003, 2004, 2005, and 2006.

3.3.1 Commercial Property

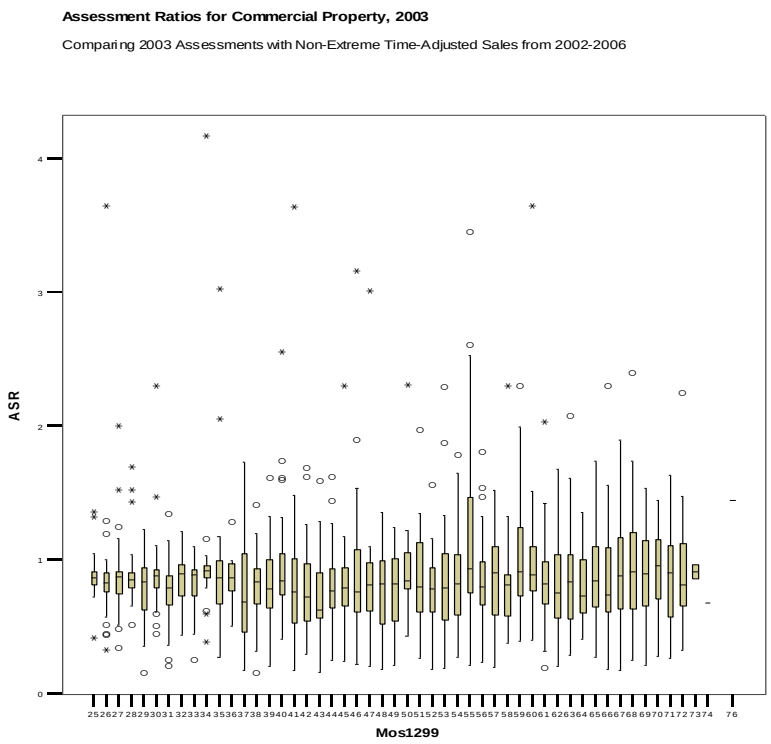
Although the state-oversight ratio study does not differentiate further than commercial and industrial properties in its stratification scheme, it is common practice for internal studies in other jurisdictions to do so for quality assurance purposes. Doing so in Fulton County, however, is highly problematic, because there are too many land use codes (LUC), or, equivalently, too few sales to judge appraisal performance reliably for each category. Combining similar categories for analytical purposes will ultimately be necessary, but pooling sales from multiple years also helps ensure that samples are not dominated by random variations. Pooling multiple years, however, necessitates the adjustment of sales for price trends. Using the standard sales/assessment ratio techniques described on pages 265-268 of *Mass Appraisal of Real Property* (IAAO, 1999), we discerned that trends ranged from 0.8 to 1.25 percent per month, depending on the base year, for commercial property. We ultimately analyzed only validated, time-adjusted sales occurring in the period 2003-2006.

There is very suggestive evidence of cherry picking, that is, of selectively validating sales (or, more bluntly, invalidating some sales) in order to make ratio results look better. These patterns are evident in the box plots presented in Figures 1 through 4, below, in which ratio results for the years 2003, 2004, 2005, and 2006 are presented, with separate ratios calculated by month of sale and by whether the sale would have occurred and been validated before or after the assessment being analyzed. In all cases "extreme" sales ratios, defined as those lying more than 3 interquartile ranges above the third quartile or below the first quartile after logarithms have been taken, were removed from the analysis. Trimming of extremes is sanctioned by the *Standard on Ratio Studies*, and is especially necessary for un-validated sales, but in this case was warranted even for the supposedly validated data at hand, inasmuch as some of the validated ratios were implausibly large. In the graphs, the individual ratios are plotted on the vertical axis and the month in which they occurred, measured in months since December, 1999, is plotted on the horizontal axis. Each monthly box encloses the central half of the data, with the horizontal dividing line

[7] "How Assessments Work – Or Don't" *Atlanta Journal Constitution*, July 2, 2006, page D1.

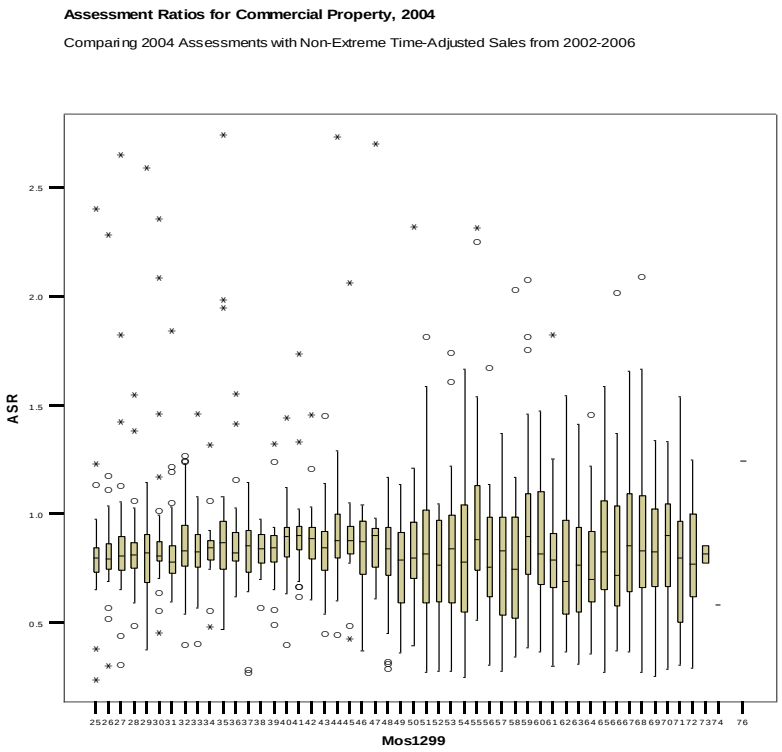
denoting the median and the vertical whiskers denoting the range of the sales distribution that would be considered neither outliers (which are denoted by open circles), nor extremes (which are denoted by asterisks). Note, however, that these outlier and extreme determinations were made after the real extremes, as discussed above, had already been removed.

Figure 1



Sales Transaction Dates Relative to When the Assessments Were Set	Median Assessment/Sale Price Ratio	Lower Bound of 95% Confidence Interval	Upper Bound of 95% Confidence Interval	Minimum Ratio	Maximum Ratio	Price Related Differential	Coefficient Of Dispersion	Count of Ratios in Sample
All Available Sales	0.84	0.82	0.85	0.15	4.16	1.01	0.30	1700
Sales Before the Assessments	0.87	0.85	0.88	0.15	4.16	1.06	0.19	369
Sales After the Assessments	0.82	0.80	0.83	0.15	3.63	1.00	0.34	1331

Figure 2

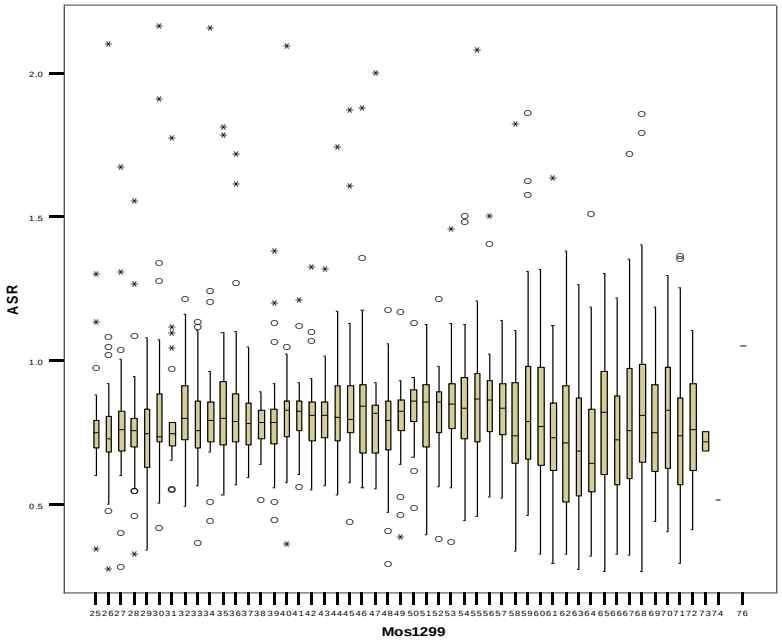


Sales Transaction Dates Relative to When the Assessments Were Set	Median Assessment/Sale Price Ratio	Lower Bound of 95% Confidence Interval	Upper Bound of 95% Confidence Interval	Minimum Ratio	Maximum Ratio	Price Related Differential	Coefficient Of Dispersion	Count of Ratios in Sample
All Available Sales	0.83	0.82	0.83	0.24	2.74	1.08	0.24	1678
Sales Before the Assessments	0.84	0.83	0.86	0.24	2.74	1.06	0.17	735
Sales After the Assessments	0.80	0.78	0.83	0.25	2.32	1.08	0.29	943

Figure 3

Assessment Ratios for Commercial Property, 2005

Comparing 2004 Assessments with Non-Extreme Time-Adjusted Sales from 2002-2006



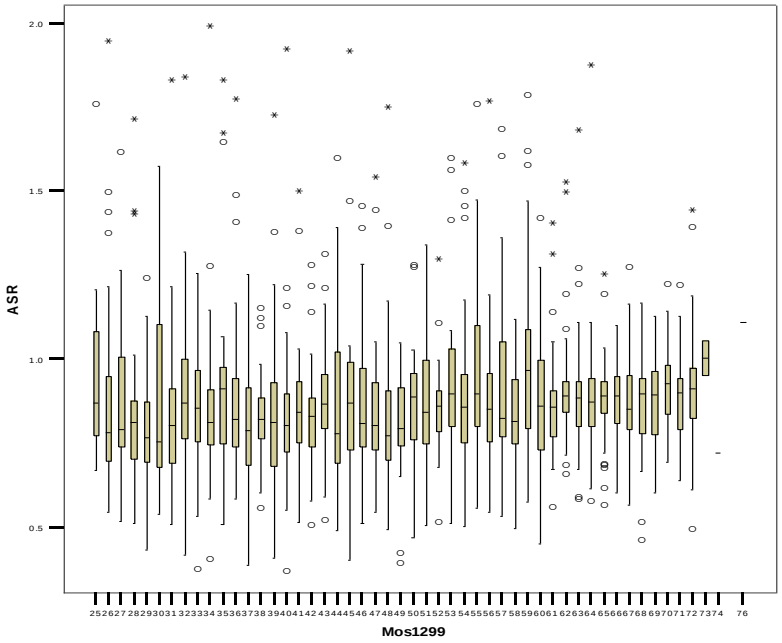
Plotted By Sale Month (as number of months since December 1999)

Sales Transaction Dates Relative to When the Assessments Were Set	Median Assessment/Sale Price Ratio	Lower Bound of 95% Confidence Interval	Upper Bound of 95% Confidence Interval	Minimum Ratio	Maximum Ratio	Price Related Differential	Coefficient Of Dispersion	Count of Ratios in Sample
All Available Sales	0.79	0.78	0.80	0.27	2.16	1.07	0.20	1667
Sales Before the Assessments	0.80	0.79	0.81	0.28	2.16	1.06	0.18	1092
Sales After the Assessments	0.75	0.73	0.77	0.27	1.86	1.07	0.26	575

Figure 4

Assessment Ratios for Commercial Property, 2006

Comparing 2006 Assessments with Non-Extreme Time-Adjusted Sales from 2002-2006



Plotted By Sale Month (as number of months since December 1999)

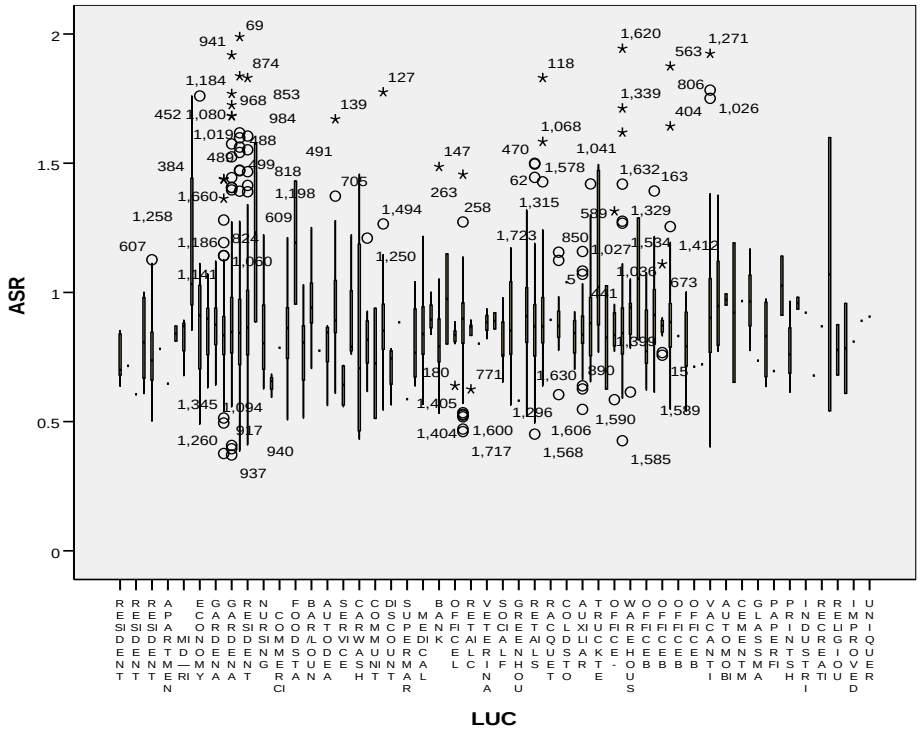
Sales Transaction Dates Relative to When the Assessments Were Set	Median Assessment/Sale Price Ratio	Lower Bound of 95% Confidence Interval	Upper Bound of 95% Confidence Interval	Minimum Ratio	Maximum Ratio	Price Related Differential	Coefficient Of Dispersion	Count of Ratios in Sample
All Available Sales	0.86	0.85	0.87	0.37	1.99	1.05	0.17	1651
Sales Before the Assessments	0.86	0.85	0.87	0.37	1.99	1.05	0.17	1647
Sales After the Assessments			Not Meaningful					4

Note that the coefficients of dispersion are much lower (and the length of the box plots much shorter) when assessments are evaluated using prior sales than when using subsequent sales. The indicated median ratios, however, are not nearly so dramatically affected. In fairness, it should be mentioned that other factors may explain some of the observed patterns, including changes to the property after the sale and imperfect time adjustments, but nevertheless the patterns observed here suggest the likelihood of a lack of impartiality in validating sales and consequently a problem in applying the results obtained from an analysis of sales ratios to the balance of the population of assessable properties.

It is also clear that properties are somewhat under-assessed. That is to say, the observed assessment ratios seem to be in the neighborhood of 90 percent, not 100 nor the 92 to 96 percent that was reportedly being targeted.

As noted above, further subdivision of the commercial assessment roll is somewhat problematical due to the large number of LUC categories relative to the number of available sales. The dimensions of this problem are more fully revealed in figure 5, where ratio medians and related data are plotted and tabulated for each code. Figure 6 presents the results at a higher level of aggregation, although not all of the detail of the previous figure is included there.

Figure 5 – Commercial Assessment Sales Ratios 2006 By LUC
Using Validated, Time-Adjusted, Trimmed sales from 2002-2006



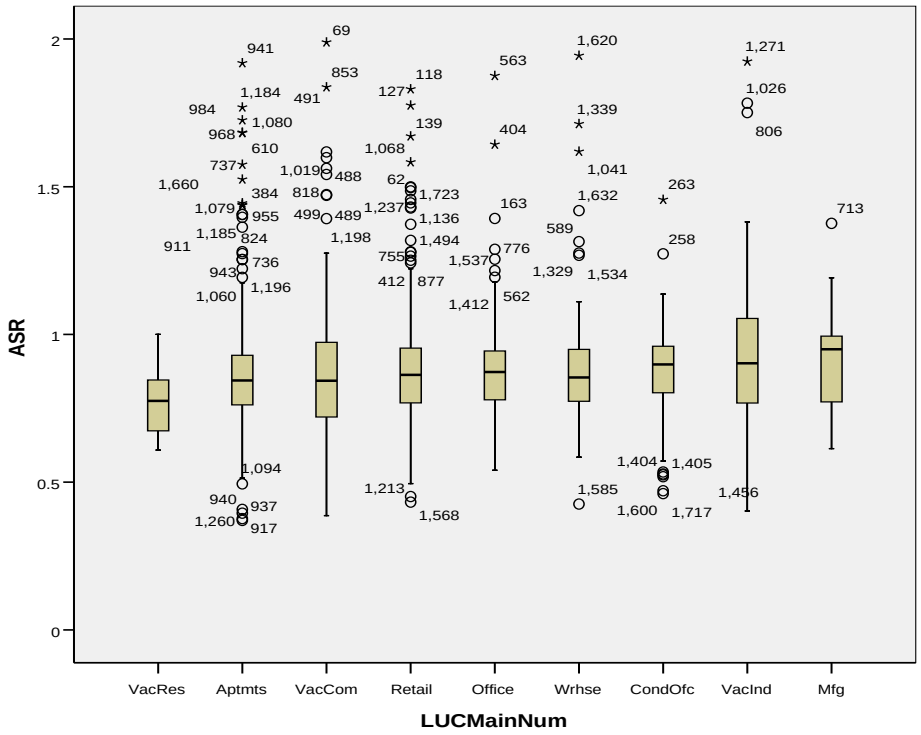
LUC Land Use Code's Meaning	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Cnt
100 RESIDENTIAL VACANT LAND (LU only)	0.70	0.64	0.85	0.64	0.85	1.11	0.11	5
101 RESIDENTIAL 1 FAMILY	0.72	.	.	0.72	0.72	1.00	0.00	1
102 RESIDENTIAL 2 FAMILY	0.61	.	.	0.61	0.61	1.00	0.00	1
200 APARTMENT VACANT LAND (LU only)	0.81	0.61	1.00	0.61	1.00	0.96	0.16	6
201 RESIDENTIAL HOUSE ON APARTMENT VALUED LAND	0.74	0.68	0.78	0.50	1.13	1.04	0.15	48
207 COMMERCIAL PROPERTY CONVERTED TO RESIDENTIAL (LU only)	0.78	.	.	0.78	0.78	1.00	0.00	1
209 APARTMENT LOFT W/O RETAIL (LU only)	0.65	.	.	0.65	0.65	1.00	0.00	1

LUC Land Use Code's Meaning	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Cnt
252 FIRST CLASS HOTEL (LU only)	0.84	0.81	0.87	0.81	0.87	0.99	0.03	2
253 MID — RISE HOTEL (LU only)	0.87	0.68	0.89	0.68	0.89	1.00	0.08	3
254 LUXURY BUDGET MOTEL (LU only)	1.03	0.85	1.76	0.85	1.76	1.07	0.23	8
255 ECONOMY MOTEL (LU only)	0.91	0.49	1.76	0.49	1.76	1.10	0.30	7
2A1 GARDEN APARTMENT (1 - 3) Class A (LU only)	0.90	0.68	0.96	0.63	1.07	1.01	0.12	14
2B1 GARDEN APARTMENT (1 - 3) Class B (LU only	0.88	0.80	0.93	0.64	1.12	1.01	0.10	23
2C1 GARDEN APARTMENT (1 - 3) Class C (LU only)	0.83	0.80	0.86	0.38	1.44	0.99	0.13	163
2D1 GARDEN APARTMENT (1 - 3) Class D (LU only)	0.85	0.81	0.88	0.37	1.92	1.02	0.22	106
300 COMMERCIAL VACANT LAND (LU only)	0.84	0.78	0.89	0.39	1.99	1.09	0.23	133
301 RESIDENTIAL HOUSE ON COMMERCIAL VALUED LAND	0.86	0.83	0.89	0.41	1.83	1.07	0.18	144
303 MINIATURE GOLF COURSE (LU only)	1.23	0.89	1.58	0.89	1.58	1.09	0.28	2
316 NURSING HOME / ASSISTED LIVING (STRCT. CODE USE ONLY)	0.80	0.68	0.97	0.63	1.22	1.07	0.17	9
318 BOARDING / ROOMING HOUSE	0.66	0.59	0.68	0.59	0.68	1.00	0.05	3
319 COMMERCIAL / RESIDENTIAL MIXED	0.79	.	.	0.79	0.79	1.00	0.00	1
321 RESTAURANT	0.86	0.81	0.92	0.51	1.21	0.98	0.14	38
323 FOOD STANDS	1.19	0.95	1.43	0.95	1.43	0.96	0.20	2
325 FAST FOOD RESTAURANT	0.81	0.65	0.95	0.51	1.03	1.03	0.15	14
327 BAR/LOUNGE	0.94	0.71	1.25	0.71	1.25	1.03	0.11	8
328 NIGHT CLUB / DINNER THEATRE	0.77	.	.	0.77	0.77	1.00	0.00	1
331 AUTO DEALER (FULL SERVICE)	0.85	0.56	0.87	0.56	0.87	1.09	0.10	5
332 AUTO SERVICE GARAGE	0.89	0.86	0.94	0.61	1.67	1.00	0.16	28
333 SERVICE STATION WITH BAYS	0.64	0.56	0.72	0.56	0.72	1.03	0.12	4
336 CAR WASH (MANUAL)	0.79	0.76	1.22	0.76	1.22	1.04	0.15	4
337 CAR WASH (AUTOMATIC)	0.71	0.43	1.46	0.43	1.46	1.20	0.51	4
339 PARKING LOT (PAVED) (LU only)	0.82	0.62	1.21	0.62	1.21	1.00	0.14	8
342 COMMUNITY SHOPPING CENTER	0.73	0.51	0.94	0.51	0.94	0.98	0.29	2
344 STRIP SHOPPING CENTER	0.85	0.79	0.90	0.55	1.78	1.04	0.17	30
345 DISCOUNT DEPARTMENT STORE	0.74	0.57	0.78	0.57	0.78	1.05	0.09	4
346 DEPARTMENT STORE	0.88	.	.	0.88	0.88	1.00	0.00	1
347 SUPERMARKET	0.59	.	.	0.59	0.59	1.00	0.00	1
348 CONVENIENCE FOOD MARKET	0.77	0.66	0.95	0.64	1.04	0.97	0.14	10

LUC Land Use Code's Meaning	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Cnt
349 MEDICAL OFFICE	0.84	0.76	0.94	0.57	1.22	1.02	0.13	23
350 TELECOMMUNICATION OFFICE BUILDING	0.89	0.84	1.00	0.84	1.00	1.00	0.05	4
351 BANK	0.79	0.71	0.94	0.53	1.49	0.92	0.17	15
352 SAVINGS INSTITUTION	0.97	0.80	1.15	0.80	1.15	1.03	0.18	2
353 OFFICE LOW RISE	0.84	0.64	0.89	0.64	0.89	1.00	0.06	7
355 OFFICE BUILDING CONDOMINIUM	0.90	0.87	0.92	0.46	1.46	1.03	0.12	133
356 RETAIL CONDOMINUIM	0.87	0.62	0.89	0.62	0.89	0.97	0.07	5
361 FUNERAL HOME	0.80	.	.	0.80	0.80	1.00	0.00	1
362 VETERINARY CLINIC	0.88	0.82	0.94	0.82	0.94	1.00	0.04	3
365 CINEMA THEATRE	0.89	0.86	0.92	0.86	0.92	1.03	0.04	2
367 SOCIAL FRATERNAL HALL	0.76	0.65	0.98	0.65	0.98	0.92	0.12	5
369 DAY CARE CENTER	0.85	0.71	1.08	0.56	1.17	1.16	0.19	9
370 GREENHOUSE FLORIST	0.58	.	.	0.58	0.58	1.00	0.00	1
371 DOWNTOWN ROW TYPE BUILDING	0.91	0.85	0.95	0.52	1.32	1.06	0.13	46
373 RETAIL SINLE - OCCUPANCY	0.87	0.80	0.90	0.45	1.50	1.02	0.15	84
374 RETAIL MULTI - OCCUPANCY	0.87	0.84	0.93	0.64	1.83	1.08	0.15	61
386 RACQUET CLUB (INDOOR)	0.89	.	.	0.89	0.89	1.00	0.00	1
390 AMUSEMENT PARK (LU only)	0.87	0.82	0.98	0.60	1.16	1.08	0.11	13
391 COLD STORAGE FACILITY	1.04	.	.	1.04	1.04	1.00	0.00	1
392 LUMBER STORAGE / RETAIL	0.84	0.70	0.93	0.70	0.93	1.00	0.07	4
393 AUXILIARY IMPROVEMENT (COMM. / IND.) (LU only)	0.84	0.81	0.88	0.55	1.16	1.00	0.11	40
394 WAREHOUSE (DISTRIBUTION) (LU only)	0.88	0.76	0.97	0.65	1.42	1.02	0.17	25
395 TRUCK TERMINAL	1.02	0.77	1.49	0.77	1.49	1.08	0.26	6
396 MINI - WAREHOUSE	0.83	0.63	1.03	0.63	1.03	0.97	0.24	2
397 OFFICE - WAREHOUSE (FLEX SPACE) (LU only)	0.83	0.78	0.94	0.58	1.31	1.13	0.13	12
398 WAREHOUSE (BULK)	0.84	0.81	0.88	0.43	1.94	1.01	0.17	81
399 WAREHOUSE (PRE - FAB METAL)	0.94	0.78	0.96	0.61	1.05	1.00	0.09	9
3A3 OFFICE BUILDING (LOW - RISE > 4) CLASS A	1.05	0.82	1.29	0.82	1.29	1.05	0.22	2
3A4 OFFICE BUILDING (HIGH - RISE < 5) CLASS A	0.77	0.67	0.95	0.62	1.07	1.02	0.13	10
3B3 OFFICE BUILDING (LOW - RISE > 4) CLASS B	0.91	0.80	1.04	0.61	1.39	1.01	0.15	16
3B4 OFFICE BUILDING (HIGH - RISE < 5) CLASS B	0.87	0.77	0.90	0.76	1.11	1.00	0.06	11
3C3 OFFICE BUILDING (LOW - RISE > 4) CLASS C	0.89	0.85	0.92	0.55	1.88	1.05	0.14	79
3C4 OFFICE BUILDING (HIGH - RISE < 5) CLASS C	0.83	.	.	0.83	0.83	1.00	0.00	1
3D3 OFFICE BUILDING (LOW - RISE > 4) CLASS D	0.79	0.54	1.00	0.54	1.00	0.89	0.16	7

LUC Land Use Code's Meaning	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Cnt
3T4 OFFICE BUILDING (HIGH - RISE < 5) TROPHY	0.71	.	.	0.71	0.71	1.00	0.00	1
3X4 OFFICE BUILDING (HIGH - RISE < 5) CLASS X (AA)	0.72	.	.	0.72	0.72	1.00	0.00	1
400 VACANT INDUSTRIAL LAND (LU only)	0.90	0.80	0.98	0.40	1.92	1.15	0.24	41
401 MANUFACTURING / PROCESSING	0.95	0.77	1.38	0.77	1.38	1.05	0.19	8
414 AUTOMOBILE PARTS MANUFACTURING (LU only)	0.97	0.95	0.99	0.95	0.99	1.00	0.02	2
415 BAKERY (LU only)	0.92	0.65	1.19	0.65	1.19	1.09	0.29	2
419 CEMENT MANUFACTURING (LU only)	0.97	.	.	0.97	0.97	1.00	0.00	1
420 CONCRETE MANUFACTURING (LU only)	0.97	0.78	1.17	0.78	1.17	1.01	0.10	4
435 GLASS MANUFACTURING (SPECIALIZED) (LU only)	0.74	.	.	0.74	0.74	1.00	0.00	1
443 METAL WORKING (LU only)	0.83	0.64	0.97	0.64	0.97	0.93	0.17	4
452 PAPER FINISHING AND CONVERTING (LU only)	0.70	.	.	0.70	0.70	1.00	0.00	1
455 PLASTICS PRODUCTS MANUFACTURING (LU only)	1.03	0.91	1.14	0.91	1.14	1.01	0.11	2
457 PRINT SHOP (LU only)	0.76	0.61	0.97	0.61	0.97	1.02	0.15	3
472 FRUNITURE MANUFACTURING	0.96	0.94	0.98	0.94	0.98	1.00	0.02	2
499 INDUSTRIAL LAND TIE-BACK (LU only)	0.92	.	.	0.92	0.92	1.00	0.00	1
600 VACANT EXEMPT LAND (LU only)	0.68	.	.	0.68	0.68	1.00	0.00	1
610 RECREATION / HEALTH	0.87	.	.	0.87	0.87	1.00	0.00	1
612 SCHOOL	1.07	0.54	1.60	0.54	1.60	1.00	0.49	2
620 RELIGIOUS (CHURCH, SYNAGOGUE, MOSQUE)	0.78	0.68	0.88	0.68	0.88	0.94	0.13	2
650 CHARITABLE OFFICE (SERVICE CENTER)	0.78	0.61	0.96	0.61	0.96	1.04	0.22	2
699 IMPROVED GOVERNMENT OWNED EXEMPT (NEC) (LU only)	0.81	.	.	0.81	0.81	1.00	0.00	1
720 RADIO / TV TRANSMITTER	0.89	.	.	0.89	0.89	1.00	0.00	1
800 UNIQUE RESTRICTED VACANT LAND (LU only)	0.91	.	.	0.91	0.91	1.00	0.00	1
Overall	0.86	0.85	0.87	0.37	1.99	1.05	0.17	1651

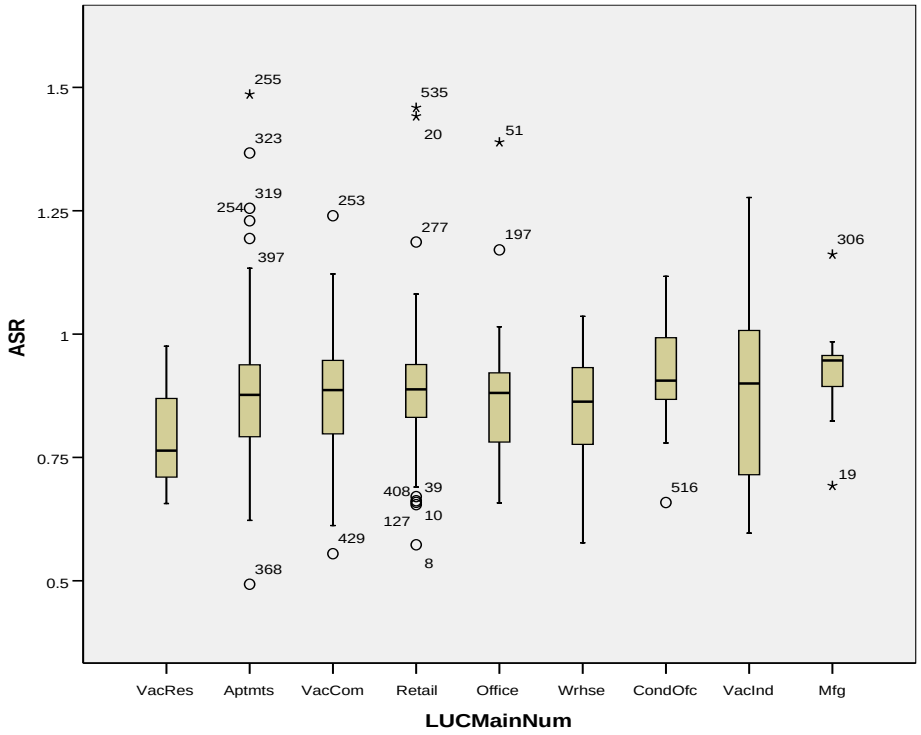
Figure 6 – Aggregating the prior data into major groups (not exhaustive).



LUC Main	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Count
10 VacRes	0.78	0.64	0.98	0.61	1.00	0.99	0.14	11
11 Aptmts	0.84	0.83	0.86	0.37	1.92	1.02	0.16	306
20 VacCom	0.84	0.78	0.89	0.39	1.99	1.09	0.23	133
21 Retail	0.86	0.84	0.88	0.43	1.83	1.07	0.16	372
22 Office	0.87	0.84	0.90	0.54	1.88	1.10	0.14	135
23 Wrhse	0.85	0.82	0.89	0.43	1.94	1.02	0.16	104
24 CondOfc	0.90	0.87	0.92	0.46	1.46	1.03	0.12	133
30 VacInd	0.90	0.80	0.98	0.40	1.92	1.15	0.24	41
31 Mfg	0.95	0.79	0.97	0.61	1.38	1.04	0.15	30
Overall	0.86	0.85	0.87	0.37	1.99	1.06	0.16	1265

The evidence suggests some categories of property may be somewhat more highly assessed than others, with manufacturing and condo offices appearing to be more likely to be relatively highly assessed and vacant residential land (coded as commercial) the most likely to be under-assessed, although sample sizes for the latter are not large enough for much reliability. In general vacant properties did seem to be assessed somewhat lower than improved ones of the same category. To address the possibility that some of these results may be artifacts of the time adjustments, Figure 7 presents data from only the most recent year.

Figure 7—Replicating the prior figure with only the current year data



Group	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Count
10 VacRes	0.78	0.67	0.98	0.67	0.98	0.92	0.13	3
11 Aptmts	0.89	0.86	0.92	0.49	1.52	0.98	0.11	107
20 VacCom	0.90	0.87	0.93	0.57	1.27	1.02	0.11	53
21 Retail	0.90	0.88	0.92	0.59	1.50	1.00	0.09	102

Group	Median	CI95Lo	CI95Up	Min	Max	PRD	COD	Count
22 Office	0.90	0.85	0.93	0.67	1.39	1.11	0.09	48
23 Wrhse	0.87	0.81	0.92	0.59	1.05	1.01	0.10	43
24 CondOfc	0.92	0.90	0.94	0.67	1.13	0.98	0.07	49
30 VacInd	0.90	0.72	1.05	0.60	1.31	1.09	0.18	19
31 Mfg	0.96	0.85	0.99	0.71	1.19	1.01	0.07	10
Overall	0.90	0.89	0.91	0.49	1.52	1.04	0.10	434

As a result of these analyses we would recommend that the county:
1. Take steps to ensure the impartiality of sales validation and the utility of ASRs
2. Perform such studies regularly.
3. Develop time adjustments.
4. Aggregate the classes of property sensibly.
5. Address the apparent disparity between vacant and improved parcels.
6. Consider whether the apparent policy of generally under assessing commercial properties should be revised.

3.3.2 Residential Property

As with the commercial assessment roll and related sales data, the amount of sales data available for properties on the residential assessment roll is less than necessary to support the fineness of the neighborhood delineation scheme. This is despite a generally robust real estate market, the extent of which is suggested by Figure 8, which also reveals the magnitude of the problem with unvalidated sales.

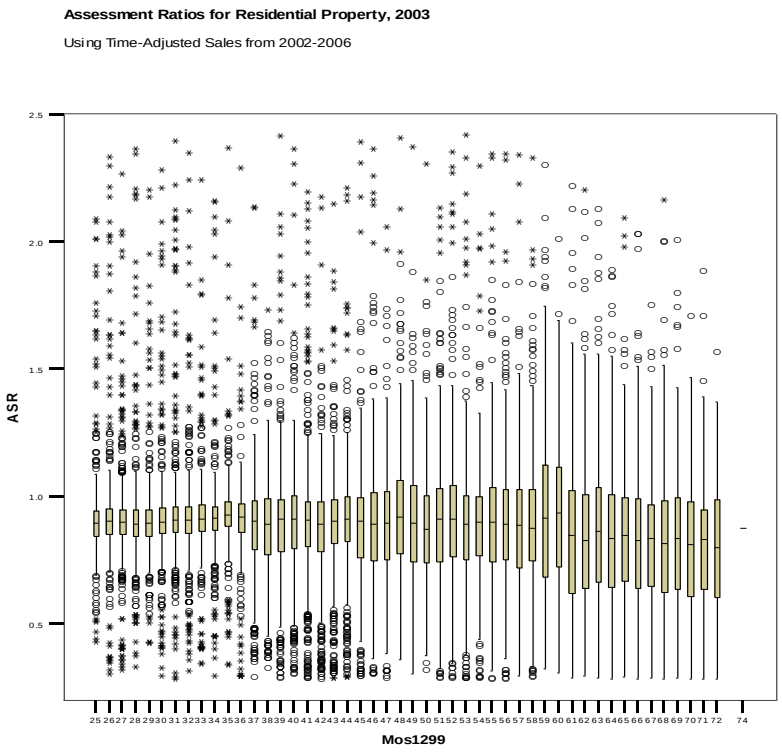
Figure 8 -- Validity Codes for sales occurring in the span 2000-2006

Validity code assigned to the sale and the meaning of the code, where defined	Frequency	Percent
*	6	.0
0 Valid Sale	48130	25.0
1 Sale parcel located in more than one jurisdiction	60	.0
2 Sale to/from exempt organization	1717	.9
3 Remodeled/ Changed after sale	2209	1.1
4 Family Sale	1811	.9
5 Forced Sale	9900	5.2
6 Sale with title/financing anomalies	1418	.7
7 Sale conveys additional interest other than property	43	.0
8 Sale not typical of market area conditions	8125	4.2
9 Unvalidated/Deed Stamps	106661	55.5
A Sale conveyed to person having adjoining property	175	.1
B Burned or razed after sale	900	.5
D	23	.0
E Trade or Exchange of property	4	.0
G Sale conveyed by deed of gift	31	.0

Validity code assigned to the sale and the meaning of the code, where defined	Frequency	Percent
I Sale conveys partial interest (INT written in large red letters on deed)	18	.0
L Life Estate	9	.0
M Sale includes multiple parcels	9182	4.8
P Assessed as land only as of January 1st - Sale included improvement	852	.4
R Sale to/from a relocation company	271	.1
S Parcel split/consolidated after sale	16	.0
T Sale less than or equal to $1000	439	.2
U	5	.0
Y Auction Sale	13	.0
Z Invalid Sale - undefined	177	.1
Total	192195	100.0

As with the commercial sales, the residential sales exhibit evidence of cherry picking if not sales chasing; see Figures 9 - 12.

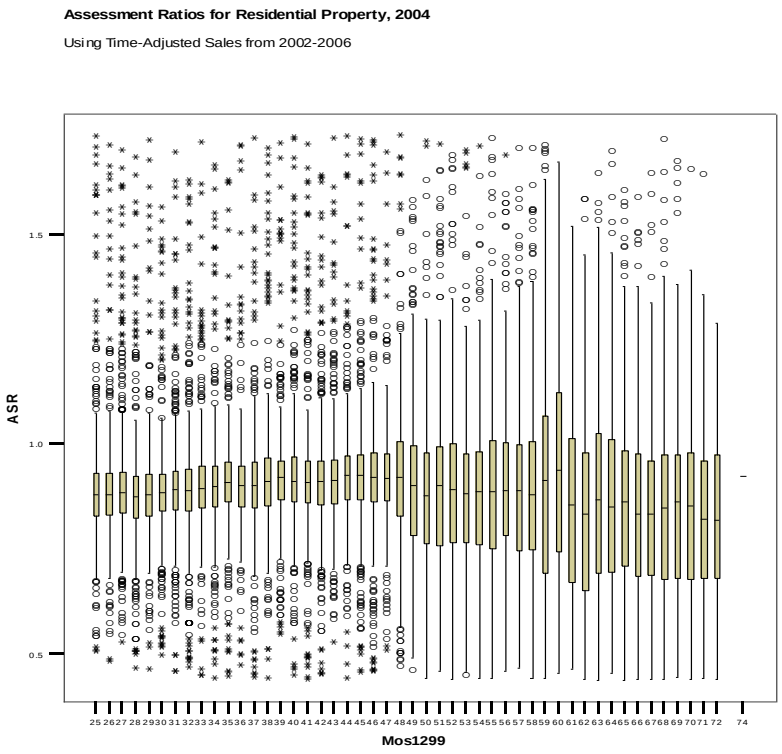
Figure 9



Ratio study results, using time-adjusted sale prices, for sales occurring before and after the assessment date: 2003

Sale period	Median Ratio	Wtd Mean Ratio	PRD	COD
Before 1/2003	.906	.894	1.026	.102
After 1/2003	.890	.845	1.042	.210
Entire Period	.900	.865	1.039	.170

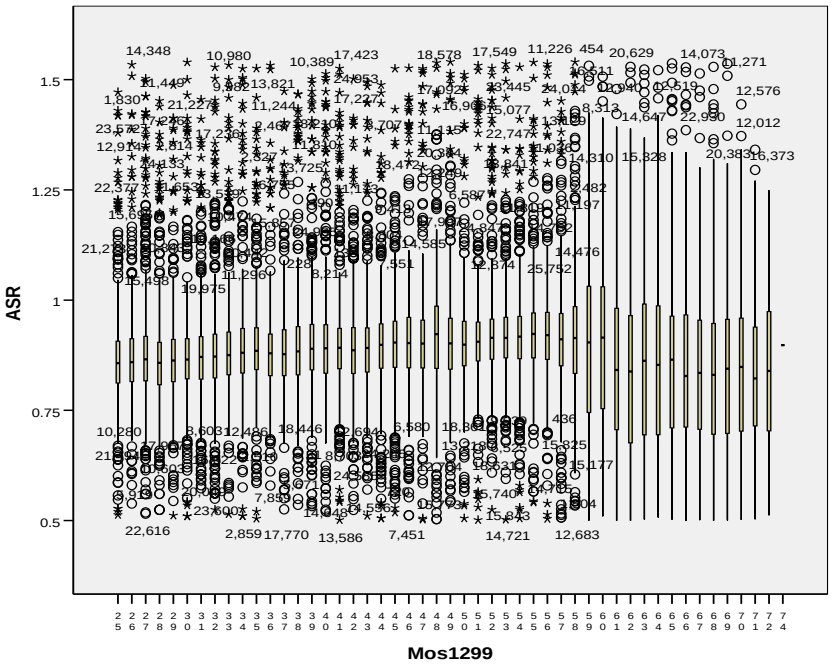
Figure 10



Ratio study results, using time-adjusted sale prices, for sales occurring before and after the assessment date: 2004

Sale period	Median Ratio	Wtd Mean Ratio	PRD	COD
Before 1/2004	.899	.896	1.014	.093
After 1/2004	.874	.840	1.037	.191
Entire Period	.894	.879	1.018	.128

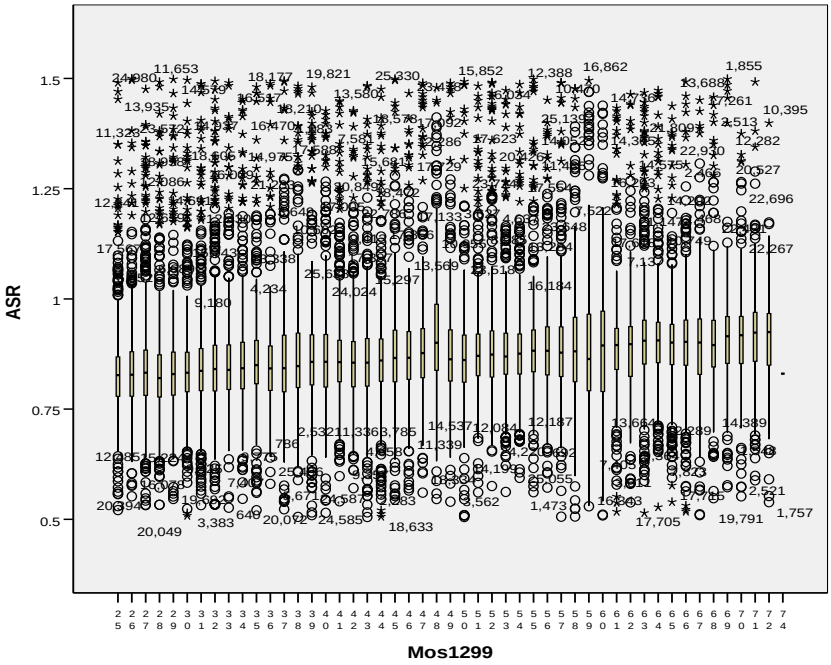
Figure 11 --



Ratio study results, using time-adjusted sale prices, for sales occurring before and after the assessment date: 2005

Sale period	Median Ratio	Wtd Mean Ratio	PRD	COD
Before 1/2005	.887	.888	1.009	.093
After 1/2005	.963	.939	1.029	.182
Entire Period	.884	.879	1.011	.106

Figure 12 --



Ratio study results, using time-adjusted sale prices, for sales occurring before and after the assessment date: 2006

Sale period	Median Ratio	Wtd Mean Ratio	PRD	COD
Before 1/2006	.860	.867	1.0101	.098
After 1/2006	N.M.	N.M.	N.M.	N.M.
Entire Period	.860	.867	1.010	.098

As was the case with LUCs for commercial property, there are too many divisions in the neighborhood coding scheme for the available data to support. The extent of the problem is suggested by Figure A1 in the Appendix, which tabulates ratio statistics for neighborhoods having at least one validated sale of a single-family residential property, the category of property having by far the most plentiful sales. As can readily be seen there, even when sales from multiple years are used (after time adjustments), most neighborhoods have far too few validated sales to allow reliable inferences to be made of trends in value for the particular neighborhood. Aggregating the multiplicity of neighborhoods into neighborhood groups, or so-called market areas, is the remedy traditionally adopted in other jurisdictions to address this problem. Doing so with the neighborhood groups defined for Fulton County yields the results presented in Figure 13. Unfortunately,

the likely utility of this approach is relatively low due to the large variation in parcel and thus sale counts and the fact that they were originally developed to facilitate the CLT comparables selection algorithm, not to facilitate sales ratio or market trend analyses.

Figure 13
Ratios of Assessments for 2006 to Time-adjusted, Validated, Non-Extreme Sale Prices from 2002-2006, by Neighborhood Group.

Nbhd Group	Median	CI Low	CI Hi	Mini-mum	Maxi-mum	PRD	COD	Count
1	0.86	0.74	1.32	0.74	1.32	1.02	0.12	7
10	0.81	.	.	0.81	0.81	1.00	0.00	1
20	0.85	.	.	0.85	0.85	1.00	0.00	1
39	0.85	0.82	0.86	0.73	1.13	1.01	0.06	61
43	0.86	0.85	0.87	0.70	1.44	1.00	0.08	334
47	0.86	0.85	0.87	0.56	1.49	1.03	0.14	327
49	0.95	.	.	0.95	0.95	1.00	0.00	1
50	0.85	0.83	0.89	0.74	1.43	1.01	0.08	48
51	0.90	.	.	0.90	0.90	1.00	0.00	1
57	0.88	0.86	0.88	0.54	1.41	1.01	0.09	350
59	0.86	0.79	1.44	0.79	1.44	1.07	0.21	7
61	0.86	.	.	0.86	0.86	1.00	0.00	1
62	0.82	0.80	0.84	0.64	1.13	1.00	0.08	98
63	0.85	0.83	0.86	0.62	1.08	1.00	0.07	189
64	0.86	0.85	0.87	0.70	1.09	1.02	0.06	56
65	0.86	0.83	0.89	0.66	1.48	1.02	0.11	41
66	0.90	0.89	0.92	0.73	1.10	1.01	0.06	171
68	0.87	0.86	0.88	0.52	1.27	1.01	0.07	170
69	0.88	0.87	0.89	0.68	1.37	1.01	0.08	151
70	0.88	0.87	0.89	0.60	1.42	0.99	0.07	186
71	0.87	0.84	0.88	0.59	1.38	1.02	0.09	118
72	0.90	0.86	0.93	0.74	1.17	1.00	0.08	51
76	0.87	.	.	0.87	0.87	1.00	0.00	1
77	0.87	0.86	0.89	0.52	1.36	1.00	0.10	133
78	0.89	0.86	0.91	0.53	1.16	1.01	0.10	85
79	0.81	0.80	0.83	0.65	1.15	1.00	0.07	83
80	0.85	0.83	0.87	0.68	1.21	1.01	0.08	62
81	0.84	0.80	0.87	0.66	1.08	1.01	0.08	58
82	0.89	0.85	0.92	0.63	1.38	0.99	0.10	37
83	0.86	0.84	0.89	0.70	1.15	1.00	0.06	131
84	0.88	0.84	0.90	0.70	1.09	1.00	0.08	58
85	0.88	0.86	0.89	0.69	1.34	1.01	0.08	227
86	0.83	0.78	0.87	0.67	0.99	1.01	0.08	28
87	0.86	0.85	0.88	0.57	1.48	1.01	0.08	227
88	0.86	0.83	0.89	0.68	1.42	1.02	0.10	100
89	0.85	0.84	0.86	0.56	1.06	1.01	0.07	226
91	0.89	0.86	0.94	0.82	0.97	1.00	0.04	14
92	0.90	0.90	0.92	0.51	1.39	1.02	0.07	100
107	0.90	0.89	0.91	0.51	1.49	1.02	0.12	293

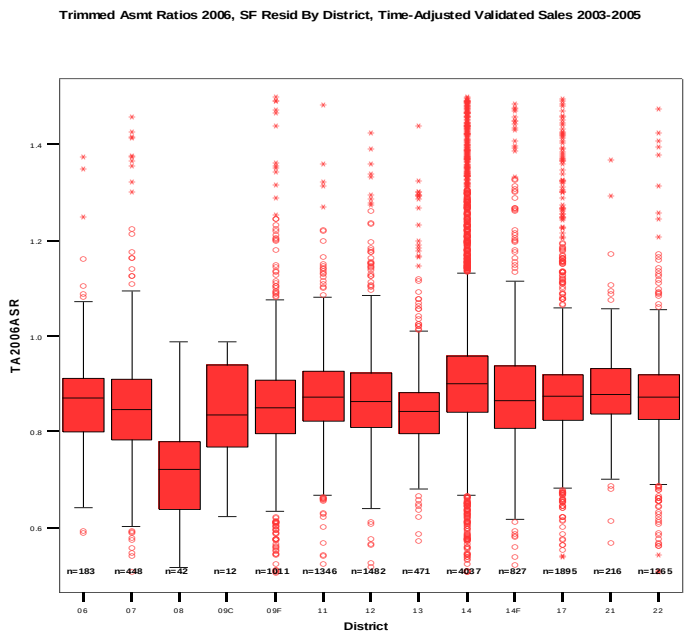
Nbhd Group	Median	CI Low	CI Hi	Mini-mum	Maxi-mum	PRD	COD	Count
108	0.89	0.88	0.90	0.53	1.48	1.02	0.12	565
109	0.91	0.85	0.94	0.69	1.06	1.01	0.07	19
110	0.91	0.88	0.98	0.69	1.50	1.02	0.11	31
111	0.90	0.89	0.91	0.51	1.49	1.02	0.12	528
112	0.90	0.89	0.91	0.56	1.45	1.00	0.07	205
113	0.91	0.90	0.92	0.54	1.49	1.02	0.13	443
114	0.90	0.89	0.90	0.51	1.50	1.01	0.12	880
115	0.90	.	.	0.90	0.90	1.00	0.00	1
117	0.85	0.81	0.87	0.57	1.44	1.01	0.12	111
118	0.84	0.84	0.85	0.59	1.32	1.01	0.07	261
119	1.04	.	.	1.04	1.04	1.00	0.00	1
120	0.88	0.85	0.89	0.58	1.41	1.00	0.11	175
121	0.89	0.88	0.90	0.52	1.48	1.01	0.10	404
122	0.86	0.85	0.87	0.84	0.93	1.00	0.02	15
123	0.85	0.84	0.86	0.51	1.46	1.02	0.11	427
124	0.73	0.69	0.76	0.52	0.99	1.02	0.13	49
125	0.93	0.81	1.01	0.70	1.18	0.98	0.10	14
126	0.85	0.84	0.86	0.51	1.50	1.01	0.10	1,090
127	0.83	0.81	0.85	0.62	1.29	1.01	0.09	126
132	0.82	.	.	0.82	0.82	1.00	0.00	1
140	0.88	0.83	0.91	0.73	1.03	0.99	0.07	34
141	0.89	0.88	0.90	0.62	1.43	1.01	0.06	152
142	0.89	0.87	0.90	0.73	1.16	0.98	0.06	39
143	0.87	0.86	0.88	0.68	1.36	1.01	0.07	176
144	0.88	0.84	0.90	0.76	0.94	0.99	0.04	19
145	0.84	0.78	0.91	0.78	0.91	1.00	0.05	8
146	0.89	0.85	0.91	0.83	0.92	1.00	0.02	10
147	0.87	0.80	0.91	0.75	1.05	1.00	0.07	21
150	0.88	0.87	0.90	0.54	1.48	1.01	0.09	84
157	0.88	0.86	0.89	0.68	1.49	1.01	0.07	116
163	0.88	0.87	0.91	0.61	1.00	1.02	0.05	75
164	0.82	0.78	0.90	0.66	1.01	1.00	0.07	13
165	0.88	0.86	0.89	0.63	1.11	1.00	0.05	56
166	0.89	0.87	0.90	0.66	1.06	1.00	0.07	67
183	0.88	0.85	0.90	0.64	1.27	1.01	0.09	105
184	0.89	0.86	0.91	0.72	1.15	1.00	0.07	75
185	0.86	0.85	0.90	0.66	1.02	1.00	0.06	34
186	0.84	0.79	0.89	0.65	1.15	1.01	0.10	31
189	0.85	0.83	0.86	0.54	1.41	1.01	0.09	182
190	0.84	0.80	0.91	0.64	1.08	1.01	0.10	31
191	0.87	0.84	0.89	0.67	1.29	1.01	0.08	61
192	0.88	0.88	0.89	0.51	1.29	1.00	0.07	581
195	0.85	0.78	0.92	0.78	0.92	1.01	0.08	2
243	0.89	0.88	0.91	0.67	1.50	1.01	0.10	168
247	0.85	0.80	0.92	0.76	1.03	1.00	0.07	13
250	0.86	0.79	0.92	0.55	1.00	1.00	0.08	10
257	0.89	0.85	0.90	0.74	1.13	1.01	0.07	48
271	0.98	0.90	1.07	0.90	1.07	1.02	0.08	2

Nbhd Group	Median	CI Low	CI Hi	Mini-mum	Maxi-mum	PRD	COD	Count
273	0.86	0.83	0.90	0.73	1.02	1.01	0.07	25
291	0.90	0.84	0.92	0.66	1.18	1.02	0.08	30
363	0.90	0.88	0.94	0.74	1.08	1.00	0.07	43
373	0.90	0.88	0.92	0.68	1.36	1.01	0.08	138
473	0.86	0.84	0.88	0.70	1.14	1.00	0.07	69
566	0.88	0.79	1.07	0.77	1.35	1.02	0.13	13
673	0.87	0.85	0.90	0.59	1.09	1.00	0.07	27
715	0.91	0.89	0.93	0.57	1.30	1.02	0.09	44
716	0.85	0.77	0.88	0.77	0.88	1.00	0.04	4
725	0.88	0.64	0.95	0.51	1.15	1.01	0.13	13
726	0.89	0.88	0.93	0.66	1.47	1.01	0.11	65
727	0.92	0.89	0.93	0.60	1.45	1.02	0.11	124
728	0.83	0.71	1.47	0.71	1.47	1.05	0.22	5
733	0.96	0.90	1.30	0.90	1.30	1.01	0.09	6
734	0.91	0.88	1.01	0.84	1.49	1.01	0.11	18
735	0.91	0.90	0.91	0.62	1.43	1.01	0.08	299
736	0.89	0.87	0.90	0.60	1.34	1.00	0.09	121
737	0.91	0.90	0.92	0.55	1.49	1.03	0.13	314
738	0.92	0.91	0.95	0.70	1.50	1.00	0.09	55
846	0.93	0.88	0.97	0.59	1.38	1.02	0.10	28
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,233

A further level of geographic breakdown is available in the form of the district number of the property, which is embedded as the first 3 characters of each property's parcel identifier. Analyses of assessment ratio data by district are presented in Figure 14.

Figure 14 -- Ratios of Assessments for 2006 to Time-adjusted, Validated, Non-Extreme Sale Prices from 2002-2006, by District (i.e. First 3 Digits of Parcel Identifier).

District	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
06	0.87	0.85	0.88	0.59	1.38	1.01	0.09	183
07	0.85	0.84	0.86	0.51	1.46	1.02	0.11	448
08	0.72	0.66	0.75	0.52	0.99	1.02	0.14	42
09C	0.84	0.77	0.94	0.62	0.99	0.99	0.10	12
09F	0.85	0.84	0.86	0.51	1.50	1.02	0.10	1,011
11	0.87	0.87	0.88	0.52	1.48	1.00	0.07	1,346
12	0.86	0.86	0.87	0.52	1.42	1.00	0.09	1,482
13	0.84	0.84	0.85	0.57	1.44	1.01	0.08	471
14	0.90	0.90	0.90	0.51	1.50	1.02	0.11	4,037
14F	0.87	0.86	0.88	0.52	1.48	1.00	0.11	827
17	0.88	0.87	0.88	0.54	1.50	1.01	0.09	1,895
21	0.88	0.87	0.89	0.57	1.37	1.02	0.08	216
22	0.87	0.87	0.88	0.51	1.48	1.00	0.07	1,265
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,235

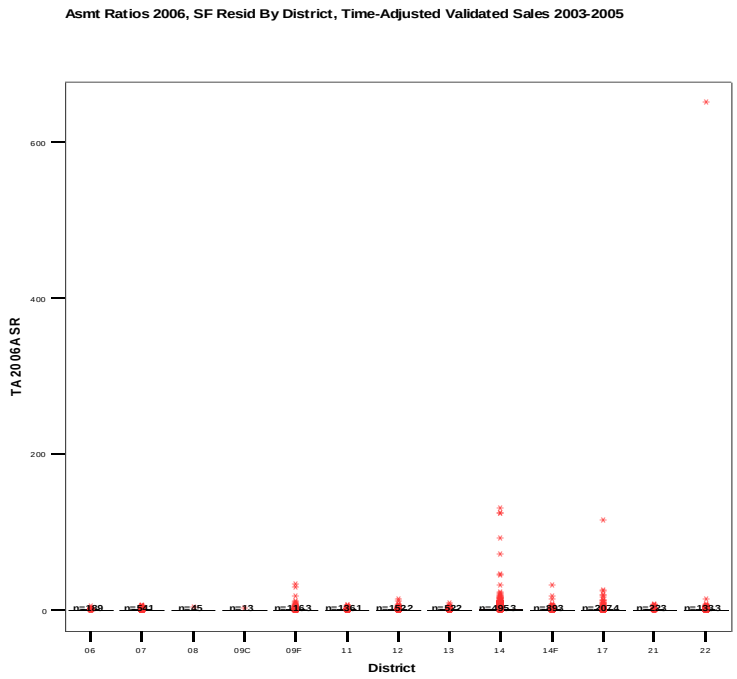


As with the commercial properties, serious questions arise about the quality with which the sales validation process is done. For example, Figure 15 presents the same data as Figure 14, but includes the parcels with extreme ratios that were supposedly validated.

Figure 15 – Replicating the previous figure using validated, time adjusted sales data from which the extremes have not been trimmed

District	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
06	0.87	0.85	0.88	0.27	4.94	1.04	0.13	189
07	0.84	0.83	0.85	0.11	6.14	1.57	0.37	541
08	0.71	0.65	0.75	0.46	4.03	1.07	0.25	45
09C	0.85	0.77	0.99	0.62	3.42	1.15	0.33	13
09F	0.85	0.84	0.86	0.18	33.49	1.34	0.39	1163
11	0.87	0.87	0.88	0.52	6.80	1.03	0.11	1361
12	0.87	0.86	0.87	0.21	14.98	1.06	0.17	1522
13	0.85	0.84	0.85	0.12	9.51	1.20	0.26	522
14	0.92	0.92	0.93	0.00	130.50	1.43	0.72	4953

District	Median	CI Lo	CI Hi	Mini-mum	Maxi-mum	PRD	COD	Count
14F	0.87	0.86	0.88	0.14	32.25	1.18	0.33	893
17	0.88	0.88	0.89	0.13	114.58	1.24	0.41	2074
21	0.88	0.87	0.89	0.57	7.43	1.13	0.25	223
22	0.88	0.87	0.88	0.38	651.09	1.64	0.76	1333
Overall	0.88	0.88	0.89	0.00	651.09	1.33	0.48	14832



Ratios that differ so dramatically from 1.00 call into question the sales validation process. If they are truly valid, they also necessitate the use of procedures for trimming sales of extreme ratios to ensure that the reported results are representative of the bulk of the properties in the jurisdiction. Appropriate trimming algorithms are not built into the county's current software, although they can be programmed relatively easily into a general-purpose statistical program such as SPSS or SAS.

Comment [RG1]: Only if extremes are included.

The possibility that inequities may have arisen due to systematic differences in how properties are classified for appraisal purposes (e.g., construction quality and condition) was explored, and the results may be seen in Figures 16-19. In general, assessment levels are quite consistent among the groups analyzed.

Figure 16 – 2006 Assessment Ratios for SF Residential Property By Grade

Grade	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
{Blank}	0.93	0.83	1.02	0.67	1.36	1.03	0.14	16
A-	0.89	0.88	0.90	0.54	1.48	1.01	0.07	381
A	0.90	0.89	0.90	0.52	1.48	1.02	0.09	749
A+	0.89	0.88	0.89	0.57	1.40	1.01	0.07	894
B-	0.87	0.87	0.88	0.51	1.49	1.01	0.08	1,122
B	0.88	0.87	0.88	0.53	1.50	1.02	0.09	1,433
B+	0.89	0.88	0.89	0.51	1.50	1.02	0.09	1,648
C-	0.87	0.86	0.87	0.51	1.48	1.02	0.12	615
C	0.85	0.85	0.86	0.51	1.50	1.02	0.11	2,534
C+	0.88	0.87	0.88	0.51	1.50	1.02	0.11	2,818
D-	0.90	0.88	0.95	0.66	1.46	1.04	0.13	25
D	0.87	0.83	0.89	0.54	1.50	1.03	0.17	78
D+	0.85	0.81	0.88	0.51	1.49	1.05	0.16	131
E-	0.89	0.87	0.92	0.83	1.04	1.00	0.04	15
E	0.89	0.86	0.90	0.67	1.09	1.00	0.06	36
E+	0.88	0.84	0.93	0.79	1.13	1.00	0.06	24
X-	0.89	0.89	0.90	0.51	1.37	1.01	0.07	308
X	0.89	0.88	0.90	0.68	1.42	1.01	0.07	237
X+	0.89	0.88	0.90	0.56	1.49	1.02	0.09	171
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,235

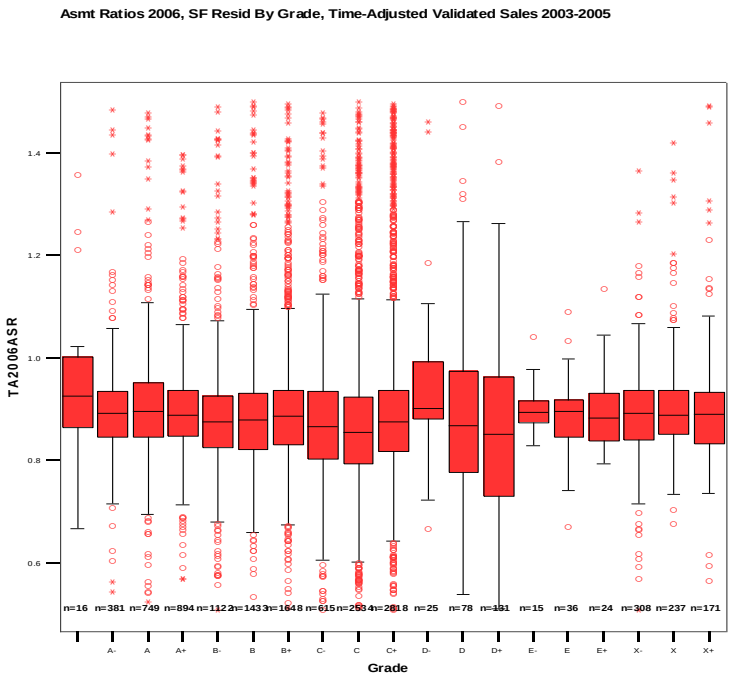


Figure 17 – 2006 Assessment Ratios for SF Residential Property By CDU

CDU	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
{Blank}	0.93	0.83	1.02	0.67	1.36	1.03	0.14	16
AV	0.87	0.86	0.87	0.51	1.49	1.02	0.12	2267
EX	0.89	0.88	0.89	0.51	1.49	1.01	0.08	1497
FR	0.86	0.85	0.87	0.52	1.50	1.02	0.12	515
GD	0.87	0.87	0.87	0.51	1.50	1.01	0.09	5284
PR	0.87	0.76	0.90	0.54	1.49	1.12	0.17	18
VG	0.89	0.88	0.89	0.51	1.50	1.02	0.10	3635
VP	1.08	0.81	1.18	0.81	1.18	1.05	0.11	3
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13235

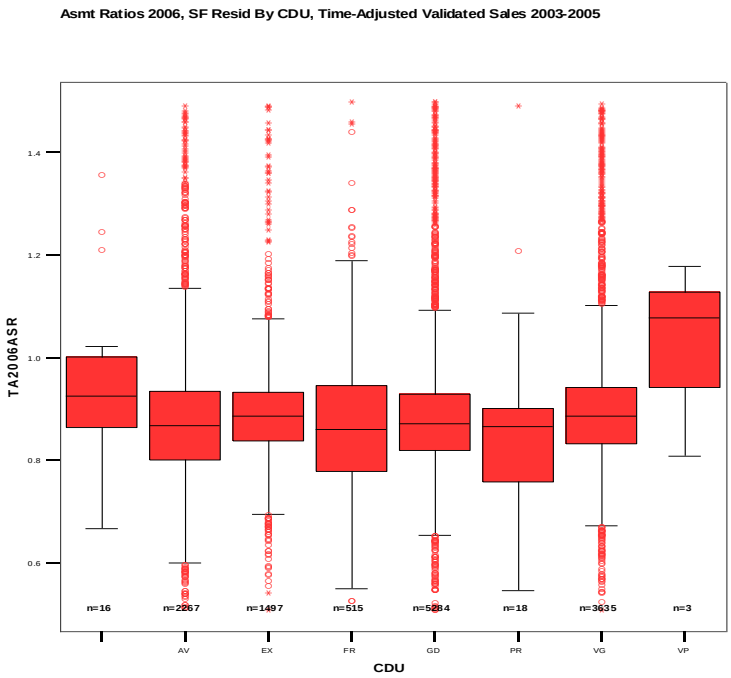


Figure 18 – 2006 Assessment Ratios for SF Residential Property By Age Group

Age Group	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
Pre 1950	0.90	0.89	0.90	0.51	1.50	1.03	0.12	2516
1950-9	0.89	0.88	0.89	0.51	1.50	1.03	0.12	1416
1960-9	0.87	0.86	0.88	0.51	1.49	1.03	0.11	1159
1970-9	0.86	0.85	0.86	0.54	1.46	1.00	0.10	811
1980-9	0.86	0.85	0.87	0.54	1.47	1.00	0.09	1465
1990-9	0.87	0.87	0.88	0.56	1.48	1.00	0.07	2650
2000-4	0.87	0.87	0.88	0.51	1.50	1.00	0.08	2905
2005+	0.91	0.90	0.92	0.51	1.49	1.01	0.09	297
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13219

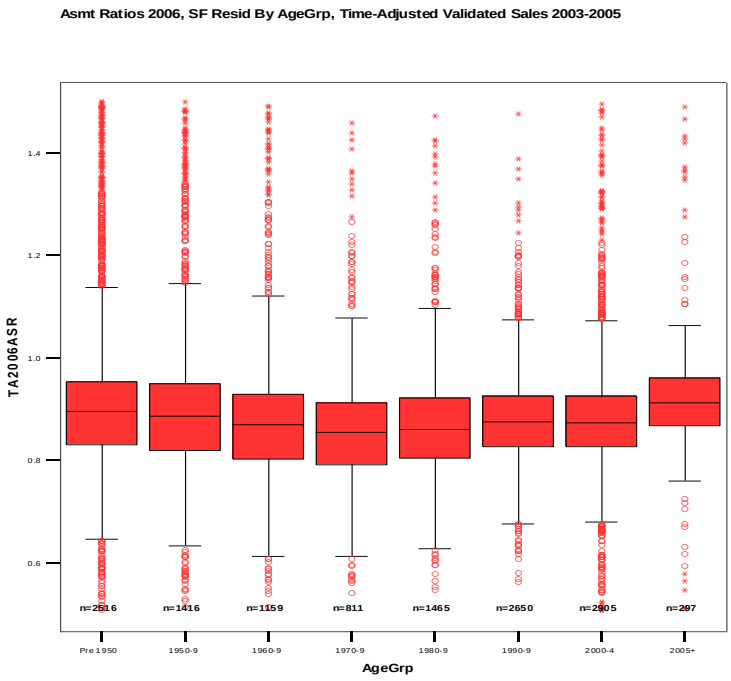
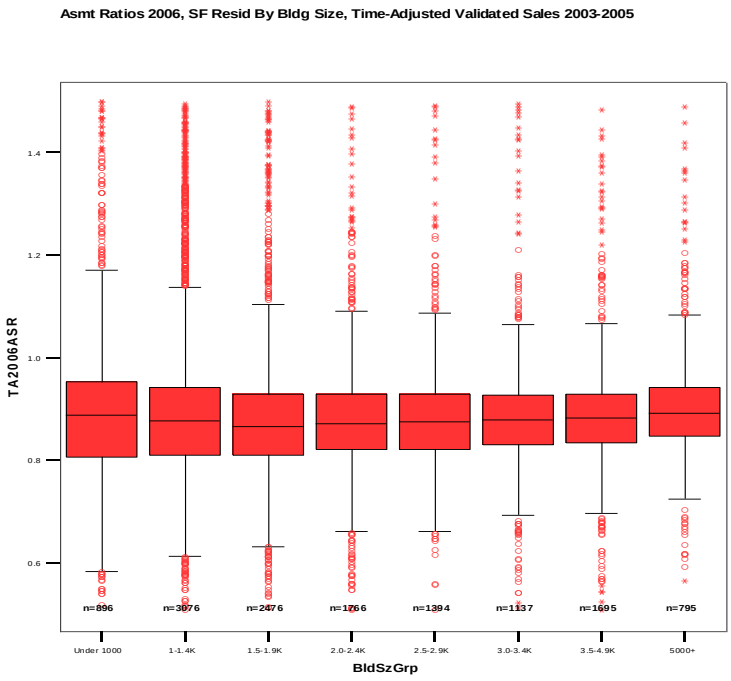


Figure 19 – 2006 Assessment Ratios for SF Residential Property By Building Size Group

Size Grp	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
< 1000 sf	0.89	0.88	0.90	0.52	1.50	1.02	0.13	896
1-1.4K	0.88	0.87	0.88	0.51	1.50	1.02	0.12	3076
1.5-1.9K	0.87	0.86	0.87	0.51	1.50	1.01	0.10	2476
2.0-2.4K	0.87	0.87	0.88	0.51	1.49	1.01	0.09	1766
2.5-2.9K	0.87	0.87	0.88	0.51	1.49	1.01	0.08	1394
3.0-3.4K	0.88	0.88	0.88	0.51	1.50	1.01	0.08	1137
3.5-4.9K	0.88	0.88	0.89	0.51	1.48	1.01	0.08	1695
5000+	0.89	0.89	0.90	0.56	1.49	1.01	0.08	795
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13235



Appendix Figure A2 provides an analysis by neighborhoods sorted not by neighborhood number but rather by median ratio, for neighborhoods with at least ten sales.

Clearly there are neighborhoods whose ratios differ substantially from those of others, a few of which have been highlighted in the table, although with about 388 neighborhoods a certain number would be expected, so care must be exercised in drawing conclusions about the statistical significance of that observation. It would be useful if the neighborhoods could be aggregated sensibly, such as by neighborhood group and the neighborhood groups aggregated by district, but the infrastructure for doing so is not yet in place.

As with commercial property it appears (in Figure 20 on page 41) that vacant properties are undervalued relative to improved. It is also obvious that there are notable differences among neighborhoods, both for vacant and improved property – even allowing for sample size constraints. This is true not only at the lowest, neighborhood, level but also at the highest, district, level. Happily, common problems observed in other jurisdictions, such as discrepancies according to the age, grade, size, or condition/desirability/utility (CDU) seem not to be especially troublesome here, although further consideration of some of the noted patterns may be warranted. As with commercial property, it is clear that residential properties are under-appraised,

but in addition to the problem of appraisal level there is a notable problem of appraisal accuracy, manifested by the high coefficients of dispersion when subsequent, rather than prior, sales are used to measure assessment performance. This pattern creates a suspicion that the sales validation process may not be impartially done, and so-called cherry picking, if not sales chasing, may be invalidating studies that rely on sales prior to the assessment date.

As a result of these analyses we would recommend, in addition to the recommendation to replace the relevant software and those carried over from the commercial property analyses, that the county:

1. Reconceptualize neighborhoods/groups.
2. Remedy differences among neighborhoods groups and districts.
3. Attend to undervaluation of land
4. Explore the possibility of developing improved CAMA models capable of reducing the relatively high coefficients of dispersion now evident for residential properties when the effects of any possible cherry picking/sales chasing are eliminated.
5. Conduct a research project to determine whether any prior practices of changing property descriptive data for sold properties incommensurately with changes for unsold properties has seriously compromised the accuracy and consistency of the County's property inventory data.

Recommendation 5 above might be implemented in any of several ways. In addition to the obvious course of action of reviewing changes made to the descriptive characteristics of all recently sold properties relative to their unsold neighbors, analysts may be able to employ multivariate statistical analyses to identify potentially mis-coded properties. If widespread problems are found, of course, a significant investment in corrective data collection would be warranted.

In general, we are concerned that:

1. the present software is unable to evaluate assessment performance adequately
2. both the internal and external ratio studies portray an unrealistically sanguine picture of assessment performance
3. expedient but improper data handling procedures may have adversely affected data consistency, possibly necessitating costly procedures to restore consistency so as to enable the application of best practices in computer assisted mass appraisal (CAMA), which are dependent on consistent data.

3.4 Future Prospects

The "to-be" design of the future assessment system involves multiple changes over a time horizon of several years, some of which have begun since the initiation of this project. Most of the software deficiencies noted above are in the process of being remedied. The basic dimensions of the procedural shortcomings have also been identified, and training and other personnel-related resolutions to such problems can be put in place fairly expeditiously. Correcting the presumed damage done to the consistency of the database, however, can be expected to take a multi-pronged, multi-year approach, given anticipated limits on the availability of human resources.

3.4.1 Software Enhancements

Replacement of the old CLT / MAS and OASIS systems by IAS, scheduled to go live by the end of November 2006, will greatly facilitate monitoring of valuation performance. The most glaring problem of the old system, its inability to calculate median assessment ratios, will be resolved immediately. The problem of corrupting data intended to be exported for external analyses is reportedly solved, although in the test installation available to us the facility did not work at all, was configured to limit exported data sets to no more than 100 records, and offered a far from adequate selection of property attributes. These are problems that can presumably be resolved by reconfiguring installation parameters, and we would strongly recommend that they be addressed as soon as possible. Additional remaining deficiencies, which we would anticipate being somewhat more problematic to resolve, include the fact that the analytical module (styled iAnalyze by CLT) appears to be limited in several important ways. First, it can deal only with record sets (styled "lists") that have been specified on the basis of stored, and not calculated, attributes. Secondly, it can only analyze sales, and not property records of interest for other reasons, such as their percentage changes in assessment from one year to the next, or the availability of income, cost, or other special data for the parcels in the record set. Thus it will be less than ideal for the purposes of isolating areas with variant assessment ratios, possibly indicative of changes in neighborhood trends, for example, since ratios are calculated, not stored. Although it would be desirable for such analyses to be integrated into the iAnalyze tool, it would be adequate for them to be conducted in external statistical software. For such a workaround to be possible, however, the aforementioned limitations on the number of records and the selection of attributes in exported record sets would have to be resolved. We urge this be done as a matter of significant priority.

3.4.2 Procedural Reforms

Our exploratory analyses suggest that the problems of cherry picking and sales chasing are probably not countywide. The former seems to be related to specific neighborhoods in any one year, apparently as a function of the ones being targeted for reappraisal activity at the time, and the latter appears to be geographically concentrated. In any event, current management is aware of the problems and has developed plans to address them through training, other personnel changes, and through the implementation of an organizational recommendation we discuss below (section 7.5), namely the institution of an assessment-standards or R&D unit reporting to the chief appraiser. That unit would have monitoring assessment quality as one of its two main missions, the other being introducing best-practices appraisal techniques. We anticipate that these steps will likely resolve the procedural problems noted within a matter of a few months.

3.4.3 Preservation and Remediation of Database Integrity

Remediation of inconsistent coding of property attributes will require significant human resources. Although various technologies might be brought to bear to minimize expensive out-of-office personnel deployments, such as identification and reviews of changed records for recently sold properties and analyses of façade and oblique photos of properties, it will likely also be necessary to canvass entire neighborhoods systematically. These may be identified on the basis of their resistance to being modeled effectively using the methods described in section 7.3, as well

as through an analysis of attribute changes for sold properties, as noted above. Aspects of budgeting for such activities are addressed in section 4.1.

Figure 20 -- Assessment Ratios for Residential Property: Validated 2003-2005 Sales Only, with Time Adjustments, Compared to 2006 Assessed Values. (Extreme ratios have been trimmed, after taking logs, per the IAAO Standard. "Residential Property" is defined here in terms of the record type in the CAMA file, rather than in terms of the land use code, which may be inconsistent, as seen below.)

Group	Median	95% CI Lo Bound	95% CI Hi Bound	Mini-mum	Maxi-mum	Price Related Differential	Coefficient of Disper-sion	Count of sales
100 RESIDENTIAL VACANT LAND (LU only)	0.84	0.82	0.85	0.51	1.45	1.02	0.16	264
101 RESIDENTIAL 1 FAMILY	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,235
102 RESIDENTIAL 2 FAMILY	0.91	0.90	0.92	0.51	1.49	1.02	0.11	334
103 RESIDENTIAL 3 FAMILY	0.90	0.85	0.94	0.57	1.49	1.02	0.12	18
106 SINGLE FAMILY RESIDENTIAL CONDOMINIUM	0.88	0.87	0.89	0.51	1.45	1.01	0.09	862
107 SINGLE FAMILY RESIDENTIAL TOWNHOUSE	0.86	0.85	0.86	0.54	1.44	1.00	0.08	713
108 SINGLE FAMILY RESIDENTIAL MOBILE HOME (LU only)	0.79	.	.	0.79	0.79	1.00	-	1
109 AUXILARY IMPROVEMENT (LU only)	0.68	.	.	0.68	0.68	1.00	-	1
110 SINGLE FAMILY RESIDENTIAL CONDOMINIUM LOFT (LU only)	0.94	0.90	0.97	0.77	1.26	1.02	0.08	36
199 RESIDENTIAL UNDER CONSTRUCTION	0.87	0.80	1.19	0.76	1.19	1.06	0.12	10
300 COMMERCIAL VACANT LAND (LU only)	1.13	0.62	1.18	0.62	1.18	0.95	0.13	4
301 RESIDENTIAL HOUSE ON COMMERCIAL VALUED LAND	0.90	0.53	1.25	0.53	1.25	1.05	0.24	6
320 COMMERCIAL AUXILIARY IMPROVEMENT (LU only)	0.84	.	.	0.84	0.84	1.00	-	1
401 MANUFACTURING / PROCESSING	0.91	.	.	0.91	0.91	1.00	0	1
600 VACANT EXEMPT LAND (LU only)	0.78	.	.	0.78	0.78	1.00	-	1
699 IMPROVED GOVERNMENT OWNED EXEMPT (NEC) (LU only)	0.87	0.76	1.02	0.76	1.02	1.00	0.09	6
Overall	0.88	0.87	0.88	0.51	1.50	1.01	0.10	15,493

4. MANAGEMENT

Property tax systems must be well managed if public acceptance is to be secured. Citizens hold tax officials accountable for their performance, as assessment officials in Fulton County know well. Management challenges include ensuring that staff complies with laws and regulations, follows policies, completes work on time, maintains standards of valuation accuracy, and uses resources wisely. To accomplish these things, managers must plan, budget, organize, set standards, control, and evaluate work.

The audits of the Board of Assessors/Assessment Department (BOA) made in 2005 and early 2006 questioned aspects of management. In section 4, we review planning and budgeting, staffing and staff organization, and internal controls, focusing on quality assurance (QA) and quality control (QC) procedures designed to achieve effectiveness and efficiency goals. We also consider workloads (issue 10 of section 3.3(D) the RFP) and the effectiveness of internal communications.

4.1 Planning and Budgeting

4.1.1 Planning

Planning is a key aspect of sound management. Assessment managers may engage in three types of planning: (1) strategic planning, (2) annual work planning, and (3), when necessary, project planning. Plans are used to establish goals, objectives, and timetables. Plans lay the foundation for budget requests. Plans provide a basis for measuring progress.

The unstable political environment in recent years has not been conducive to serious strategic planning. Considerable energy has been devoted to identifying weaknesses in the Assessment Department. However, recent chief appraisers, especially the incumbent, have had a general vision of the changes needed to elevate the Assessment Department to a first rate assessment organization. This review has been an element of that vision. Provided that there is sufficient high-level political support, a formalized participatory strategic planning should be initiated at first opportunity. The aim would be to reinforce organizational strengths and eliminate weaknesses by developing a shared vision of the future of the Department, of the changes in standards and practices that would be needed to realize the vision, and of accountability for achieving mutually agreed upon objectives.

We also recommend that units improve annual work planning. While striving for brevity, work plans should be linked to strategic plan objectives and address such things as why the activity in question is important, the estimated quantity of work to be performed, target productivity rates for routine, repetitive activities, and the resultant level of effort (worker) requirements. Scheduling issues should also be addressed.

4.1.2 Resource Needs and Budgeting

The resources devoted to property tax administration reflect the political support for accurate and equitable assessments and for effective taxation. The nature of the assessment workload and operational efficiency also affect resource requirements. Commendably, Fulton County is implementing performance budgeting, which requires departments to define objectives and measure performance. Although budget details are presented in an object classification format, the Assessment Department's budgets reflect the organizational structure making it possible to do some program analysis. There are separate budget groupings for operations (2401), commercial (2402, and residential (2403). New spending requests (including changes to existing authorizations) must be documented.

Funding for the Assessment Department totaled $12,000,000 in fiscal year 2006, which is slightly less than the $12.1 million in the 2005 amended budget. This works out to about 0.7 percent of total property tax revenues or about $39 per parcel. The former benchmark is typical of large US assessment districts; the latter may be comparatively high, although the latest survey of large assessment district budgets was made in 1999. Salaries and benefits constitute the greatest portion of any assessment budget. So it is with Fulton County: staff costs account for about 92 percent of total funding.

It is possible to estimate staffing needs by using workload measures and expected productivity rates. The accuracy of the estimates, of course, depends on the accuracy of those measures and rates and on underlying assumptions. We attempted to evaluate staffing needs based on available data on workloads and productivity. When the latter were lacking, we substituted data from benchmark studies of other assessment agencies. Among the assumptions are two changes in valuation practices: (1) a program of inspecting all properties over a three-year cycle and (2) a program of market monitoring and valuation model building. However, the model-building activities are presented with the commercial and residential divisions, not in a separate unit as we recommend below. The results of the analysis are presented in table 4-1. They reinforce the notion that the BOA is not under-staffed. They also suggest that, with appropriate reassignments (assuming that skills are appropriate), the new initiatives suggested above could be undertaken within the existing staff complement. More accurate and up-to-date data on workloads and productivity rates, as well as a more accurate portrayal of tasks, could be used to refine the estimates.

Table 4-1: Estimated staffing requirements

Activity	Estimated workload	Estimated productivity rate/day	Days of work	FTEs	Notes
Board & Executive				**10.0**	See detail below
Board				5.0	Continued existence assumed
Secretary				0.5	Ditto
Chief appraiser				1.0	Ditto
Assistant chief appraiser				1.0	Ditto
Executive support				2.5	Assumes that responsibility for the board secretary comes from this group
Operations				**54.3**	See detail below
Management				3.0	Assumes no change; no analysis of need made
Deeds	55,000	50	1,100	5.0	Deeds read & ownership & address changes made as required
Map changes	10,000	30	333	1.5	
Permits logged	30,000	50	600	2.7	
Homestead	176,000	20	8,800	40.0	Includes residential taxpayer assistance
Exemptions	5,000	20	250	1.1	
Notices	100,000	500	200	0.9	
Commercial, industrial, and personal property				**45.1**	See detail below
Management				1.0	
Screen sales	500	30.0	1,167	5.3	
Inspect sales	300	15.0	1,333	6.1	
I&E questionnaires	1,000	25.0	40	0.2	
Modeling building/QA	15	0.5	30	0.1	Models for apartments & retail commercial (4 each), and retail, offices & hotels (3 each), shopping centers (1), and industrial (4)
Permits worked	500	2.0	250	1.1	
Scheduled field inspections	6,767	12.5	541	2.5	Roughly one-third of all properties with an allowance made for properties inspected for other purposes
Appeals	900	0.5	1,800	8.2	
Personal property assessments	32,000	15.0	2,133	9.7	Send, receive, and process returns
Personal property canvasses	2,000	15.0	133	0.6	Coordinated with scheduled field inspections

Activity	Estimated workload	Estimated productivity rate/day	Days of work	FTEs	Notes
Audits	120	0.1	960	4.4	Figures jiggered to reflect actual workload targets
Appeals	500	0.5	1,000	4.5	
File updates	32,000	100.0	320	1.5	
Residential property				**25.6**	See detail below
Management				1.0	
Screen sales	35,000	30.0	1,167	5.3	
Inspect sales	20,000	15.0	1,333	6.1	
Modeling building/QA	20	0.5	40	0.2	It is assumed that there would be at least one model for each municipality plus several condominium models
Permits worked	23,000	8.0	2,875	13.1	
Scheduled field inspections	75,667	35.0	2,162	9.8	Roughly one-third of all properties with an allowance made for properties inspected for other purposes
Appeals	10,000	10.0	1,000	4.5	
File updates	60,000	100.0	600	2.7	
Sub-total				**135.0**	Of department totals above
Overhead					
Professional development	55	20.0	1,100	5.0	Number of staff that must be certified multiplied by 20 hours per year
Other				1.4	
Total				**141**	

Some feel that the Assessment Department needs more office space. Uncertainties about the size of the staff and the space allocated to the Department prevent us from opining about that need. The physical layout of the offices in [the Pryor Street building] appears sub-optimal, however.

4.2 Organization and Staffing

As noted, the BOA oversees the operations of the Assessment Department and sits as an appeal body as well. It ordinarily meets twice a month. Meetings are public. Meetings are formal and well organized, and minutes are kept. Naturally, the Department provides secretarial support to the Board, and a member of the staff has a formal position as Secretary to the Board. As the Board is not full-time, the secretary position is not full time, and the current secretary also heads the personal property section. We believe this division of responsibilities is detrimental to personal property assessment

The organization and staffing of the Assessment Department has been in flux. Prior to the appointment of the current chief appraiser (CA) and assistant chief appraiser, there were three division head-level deputy chief appraisers who reported directly to the CA. The divisions are responsible for administrative support (operations), residential appraisal, and commercial property appraisal (including industrial real property and personal property).

A previous CA instituted a number of organizational and institutional changes. The overall aim was to make the Department more self-sufficient. A more modern CAMA system (iasWorld or IAS) was ordered. Attempts were made to make appraisers more well rounded and to increase mass appraisal skills by enrolling [some] appraisers in the mass appraisal program offered by the University of British Columbia (UBC). Organizationally, units responsible for valuation standards and land valuation were disbanded. Within appraisal divisions, real property appraisers were given regional areas of responsibility. The county is divided into four broad regions that are political as opposed to economic in origin: North, 17th, 14th, and South districts. A team of residential appraisers is assigned to each of these regions. There are only two commercial regions: North and South. As of our engagement, these changes have not been fully—or successfully—implemented. There is a north-county satellite office and several other customer service offices in which taxpayers may file returns and apply for homestead exemptions.

The total staff of the Assessment Department approximates 153, excluding members of the Board, temporary positions, and vacant positions. This equates to one staff member for every 2,000 parcels, an unusually low ratio for a large assessment district (a typical ratio of one employee per 3,500 parcels). This ratio does not account for personal property accounts, which total about 32,000 (as with real property parcels, definite statistics were not readily available).

The personal property section has eleven personal property appraisers and four auditors in addition to the section head, who also serves as the secretary to the Board of Assessors. As noted, this responsibility may detract from his ability to manage personal property assessment effectively. In any event, there are about 2,000 assessments per professional staff member, which appears to be a slightly lower ratio than is typical (which would be about 2,200 accounts per person), although many assessment districts fail to audit personal property accounts as well as Fulton County does.

The Operations Division is responsible for a number of important businesses processes. It has the following sections: Field Book, GIS and Mapping, Homestead, and Clerical and Special Properties. The so-called Field Book section is responsible for deed processing, including updating ownership records and legal descriptions. The GIS and Mapping section processes parcel combinations and splits. The Homestead section administers homestead exemptions. The Clerical and Special Properties section administers tax allocation and urban enterprise districts; conservation, historic property, and brown field assessments, fully exempt properties; and tax digest preparation. It also provides clerical support in several areas, including appeal case tracking.

As suggested above, the Commercial Division is responsible for the valuation of commercial and industrial real property and taxable business personal property. The Residential Division is responsible for the valuation of low-density residential property.

Appraisers in Georgia must meet state certification requirements. There is some dispute about whether an adequate number of Fulton County appraisers do. A larger issue is whether the state requirements are consistent with the needs of modern computer-assisted mass appraisal. To its credit, the Assessment Department has attempted to increase the mass appraisal skills of its staff, as noted above. In addition to State certification requirements, the staff of the Assessment Department must comply with the County's code of ethics, which is administered by the board of county commissioners. Allegations of coziness between assessment staff and certain (unidentified) tax representatives suggest a need either to enforce ethical standards effectively or rebut the allegations convincingly (which the Department may have done by instituting measures to break links between staff members and tax representatives).

4.3 Quality Assurance and Work Management

The previously cited audits have drawn attention to questions about the quality of work by the staff of the Assessment Department and about management's abilities to ensure that work is done correctly and timely. The "As Is" system and organizational culture contribute to perceived if not real quality problems. Although there have been hierarchical reviews of work performance, there appears to be insufficient information transmitted upward to allow for effective work quality reviews. More importantly, lower-level reviewers have been able to transfer ultimate accountability for data and work quality upward through the chain of command, ultimately to the BOA itself. In essence, no one has to take responsibility for deficient performance. Current CAMA system limitations (e.g., the lack of analytical tools and difficult-to-maintain tables) are part of the problem as well. Conscientious members of the Department staff and current management acknowledge such systemic weaknesses and are seeking remedies.

The Assessment Department has had in place some elements of a quality assurance program. Although the staff naturally learns much about their work on-the-job, the Department has basic documentation of many functions. It also has copies of various CLT appraisal manuals (including the new IAS manuals). The Department also has had some elements of a modern work flow management system. There are some productivity benchmarks. For example, the head of the Field Book section expects that each clerk will read about seventy-five ordinary deeds per day. New work usually is logged and many of the staff submits reports of work accomplished. Although raw productivity statistics are maintained in Excel files, they appear not to have been analyzed or aggregated. In short, there has been no computerized system for maintaining management information.

As noted in section 3 and discussed further in section 5.2, a particular area of concern is that property attribute data are inaccurate and are being degraded as an expedient way of obtaining a desired value from the CAMA system, because changing a qualitative variable like grade or CDU (which simultaneously codes for condition, desirability, and utility) is easier to accomplish than updating a factor in a valuation table.

The new chief appraiser and assistant chief appraiser are cognizant of such shortcomings and hope to remedy them. Changing the organizational culture will neither be easy nor quick. However, the previously recommended strategic planning exercise and simple, consistent communi-

cation of expectations can be helpful. Clearly, many of the staff would welcome an environment in which they could fully realize their professional potential.

5. REAL PROPERTY DATA COLLECTION AND MANAGEMENT

The success of any CAMA system depends on the accuracy of its data. There are two types of CAMA data: market data and property characteristics. Market data include sales data, income data, and cost data. Income and cost data are discussed in the context of the income and cost approaches to value in section 6 below. Sales data are common to all three approaches and are also used in performance monitoring and ratio studies. Sales data are discussed in section 5.1 below. Section 5.2 discusses collection and maintenance of property characteristics data.

5.1 Collection and Validation of Sales Data

Real property transfer deeds and the related PT-61 form provide the initial source of sales data. In the past there was a considerable time lag in obtaining copies of deeds and PT-61 forms from the Clerk of the Superior Court. However, they are now scanned and transmitted to the assessment office almost daily. These documents provide the assessor's office with information about changes of ownership and sales prices used in the development of mass appraisal models and ratio studies. SB 535, which was signed by the Governor in May 2006, now requires entry of parcel numbers on all filings. The clerk of the superior court is not to accept PT-61 forms without parcel numbers.

In addition to parcel number, the PT-61 provides for the site address of the property, the name and address of the buyer and seller, sale date and price, the value of any personal property or unsatisfied liens and encumbrances on the property, buyers intended use (residential, agricultural, commercial, or industrial), and number of acres. Unfortunately, there are no questions concerning whether the buyer and seller are related, whether the property was exposed to the open market, or other circumstances surrounding the sale, or whether the sale price is believed to be fair and representative of market value. The real estate transfer tax is 0.1% (e.g., $130 on a $130,000 sale), which should not impede honest reporting of prices. PT-61 can be completed and printed on the Georgia Superior Court Clerk's web site (www.gscca.org).

"Field book" operations (the county's term for subdivision, sales, and ownership processing) falls in the Administrative Services Section of the Operations Division. The Department reviews deeds, annexations, and subdivision plats to maintain a current inventory of all real property parcels in the county, as well as the legal owner and proper tax status (taxable or exempt). Of course, some deeds and other documents are very complex and are handled by supervisors, who acknowledge the need to train other staff to handle them.

Sales are screened for validity by the residential and commercial sections. The Residential Section determines the validity of sales largely by reviewing the PT-61. If the price looks reasonable for the neighborhood, the sale is accepted. For the worst outliers (generally ratios less than 0.40 or greater than 1.20), staff will review the sale in the field. Currently there is only one workstation per office for looking up PT-61 forms, which greatly impedes sales research. Staff should be able to view scanned images on PCs.

Following good practice, staff assigns transaction type codes to indicate whether sales are considered valid representation of market value. Code "0" indicates a valid sale and various codes are provided for invalid sales. A separate verification codes indicates the basis for verification (e.g., code "D" indicates verified from the deed and code "F" indicates field-verified). Code "U" is assigned to unverified sales. The residential staff reports finding 80% to 95% of sales to be valid in most neighborhoods, although distressed areas can be as low as 50%. Note, however, that these figures must relate only to neighborhoods targeted for work in a given year, inasmuch as Figure 8 above reveals a great number and proportion, overall, of un-validated sales.

As discussed in section 3, we are concerned about the validity of past sales screening practices. Not only are the majority of sales not being validated, it also appears that sales sometimes have been selectively screened to match existing assessments. All sales should be screened and while existing ratios can serve as a review flag, determinations of validity should be based on objective evidence. Outlier prices and ratios can be addressed during the valuation process and in sales ratio programs.

5.2 Collection and Maintenance of Property Characteristics Data

Building permits provide the primary source of information about construction activity. There are at least ten different city permitting systems and, unfortunately, most do not provide data in electronic format and none provide parcel numbers. Clearly, a standard format with minimum required information (including parcel number, type of work, and estimated value) would expedite the processing of permits. On the positive side, the cities have agreed to provide the assessment office copies of certificates of occupancy (formerly they did not). The new chief appraiser has vigorously reached out to municipalities to underscore the mutual benefits of their cooperation. Legislation to require cities to provide permit data in standard, electronic format would expedite the work of the assessment office.

When information about a permit is received, it is logged, and a determination is made about whether the permit implied an assessable activity. The appraisal staff is notified of permits that will require monitoring. Permit reasons are coded in the notice (new construction vs. maintenance; residential vs. commercial). After permit data are transmitted to appraisers, there is no centralized monitoring of permits.

By accessing the county's web site (co.fulton.ga.us) one can view key data for a desired property, including a map showing its location and a sketch showing areas and square feet (the test parcel that we accessed was obviously mislabeled). Property owners can use the web site to verify the accuracy of their data, although definitions for several items (such as construction grades) would be helpful.

The data items currently provided for in OASIS (and to be converted to IAS) are adequate. The residential system includes all building variables that tend to have a significant influence on value without being overly complex or detailed. Land data are sparse, following the CLT philosophy of adjusting for site influences through influence factors, determining land values prior to modeling, and then constraining land values to 1.00 during modeling. Nevertheless, there are

variables for topography, utilities, street type, waterfront and view that can be used in model development.

Commercial data include all improvement items needed to drive the cost approach. Although many of these are not needed for the income approach, they put the county in the position of being able to run both cost and income values for all commercial properties[8]. Also, they permit generation of building values and thus land residuals for potential use in calibrating commercial CALP tables. Land data are similar to that maintained in the residential system.

Of more concern than what data items are maintained is the quality or accuracy with which they are coded. We have heard anecdotally that appraisers may change the grade on properties in order to achieve a desired value. Our own analyses confirm as much. We found, for example, that for single-family residential properties in 2006, there was a change in grade, CDU, or condition rating for over half of properties sold in 2005, but for only 2.3% of unsold properties[9]. While the desire for accurate values is understandable, data changes of this type tend to compromise the database, necessitating further adjustments to keep values equitable and accurate over time. Although senior appraisers would have to perform field reviews on a meaningful sample of records to gain a first hand evaluation of the accuracy of existing data, one can get a helpful indication of data quality through ratio study results (see section 3.3.1). There do not appear to be any procedures in place for systematically checking data accuracy, although as suggested above there is likely a need to do so.

The county could make better use of modern technology in data collection. For example, it has facade photos of improvements, but no longer makes them available to the public due to their datedness (up to 15 years old) and the high incidence of picture-property mismatches. The county is considering replacing these. Although it does not currently make use of hand-held computers, the capability to use them was a feature in the recent procurement of services for the commercial reappraisal for 2008. Low-level aerial photography, with pictures taken obliquely rather than straight down, also is of interest to the county for several reasons. Although it would generally not be of sufficient resolution to permit routine in-office review of codings for grade and CDU, since each property would be viewable from multiple angles it would likely be adequate on an immediate basis to confirm or allay suspicions of data tinkering in small specific areas as discussed in sections 3.4.3 and 4.3 above. On a longer-term basis, once a second year of photos is obtained, the two sets can be automatically processed by change-detection software to ensure that property improvements have not been omitted from the assessment rolls.

[8] The cost approach is used in the year of construction, after which most commercial properties are appraised by the income approach (see section 6.6).
[9] The analysis excludes recently built or remodeled properties.

6. REAL PROPERTY APPRAISAL

6.1 Reappraisal Cycle and Standards

6.1.1 Reappraisal Requirements

Rules of the Georgia Department of Revenue [specifically rule 560-11-2-.56(3)(a)] require that real property be appraised at least every three years and that certain sales ratio standards must be met in these years. The level of assessment for each major class of property (residential, commercial, industrial, and agricultural), as measured by the Auditor's assessment-to-sales ratio, must be between 0.90 and 1.10. The COD must not exceed 15.0 for residential property and 20.0 for other property classes. PRDs must fall between 0.95 and 1.10. The Department of Audits and Accounts performs sales ratio studies to verify compliance with standards.

The Fulton County Board of Assessors strives to exceed these standards. Its policy is to maintain a level of assessment of approximately 0.92 to 0.96 for each property class, to strive to achieve a COD of 10.0 and PRD of 0.98 to 1.03, and to ensure good equity between various geographic areas and property subclasses. Its goal is to be prepared to reappraise annually as needed to achieve these objectives. However, in the last reappraisal year (2004) the Auditor General found a ratio of 0.87 for commercial property, which resulted in penalty payments to the state. The next reappraisal year in the state cycle is 2007, for which the commercial section is striving to increase the valuation levels to 0.95.

In reality, software constraints, data quality issues, and limitations on the availability of personnel have combined to preclude annual appraisals and to have necessitated contracting with a vendor for commercial reappraisal services, including data collection, for the year 2008.

6.1.2 Appraisal Calendar

The legal assessment date is January 1 of the reappraisal year. Thus 2006 assessments are pegged to a base date of January 1, 2006. Reappraisal analysis begins in earnest early in the year, and counties must notify property owners of value changes by July 1 and by June 1 in counties providing for the payment of taxes in installments.

Counties must submit their assessment digests to the Department of Revenue by the end of the notification month of the reappraisal year (by June 30 in Fulton County). Approval requires that value in contention not exceed a given threshold dependent on whether or not the county has conducted a full reappraisal, which is defined as the issuance of value notices on more than 50% of all properties. If a county has conducted a full reappraisal, not more than 5% of the total value of the submitted digest can be under contention. If the county has not conducted a full reappraisal, not more than 3% of value can be under contention. Since value under contention includes property for which appeals from prior years have not been resolved, this requirement can be difficult in counties, like Fulton, that have a large number of high-value commercial properties that frequently appeal.

6.2 Appraisal of Residential Vacant Land

Fulton County uses CLT's CALP (computer-assisted land pricing) tables. Currently residential tables are indexed by city and zoning codes into 41 "zones". Square foot, acreage, and gross land valuation tables contain valuation parameters for each relevant zone. Within zone, valuation parameters vary with sewer (yes/no), street type (paved, gravel, or unpaved), and land type. Square foot valuation tables contain base lot sizes, base per square foot values, and size adjustments for the following land types: primary, secondary, residual, waterfront, water view, undeveloped, and common area. Acreage tables are similar except that base size and rates are defined in acres and reflect these land types: home site, flood plain, utility easement, wasteland, primary site, secondary site, residual land, waterfront, water view, and undeveloped. Gross land tables contain lump sum values for irregular shaped land, site-valued land, residual land, waterfront lots, and common area land (a right-of-way adjustment is also provided).

A key CALP table is the "neighborhood group table" (table 6), which permits appraisers to specify the following for each neighborhood: NBHD group (used to group neighborhoods for comparable sales analysis); neighborhood CDU table (explained in 6.3 below); typical grade and CDU (information only); and land, building, and OBY (other building and yard improvement) factors. Importantly, land, building, and OBY factors are used to update or trend all residential property in a neighborhood. The county makes extensive use of these factors. (Note that land rates in CALP tables are not based on neighborhood codes, rather they are based on zoning, sewer, and street type as described above and neighborhood codes are used to apply adjustment factors to land rates.)

CALP also provides for land influence adjustments to reflect topography, shape, economic restrictions, and certain other site influences. The appraiser can enter codes for one or two such features followed by the desired adjustment percentage (e.g., -10% or –25%). Except for "view", only negative adjustments appear to be contemplated with no codes provided for other positive influences such as golf courses or greenbelts (although the view factor can be used, current codes do not permit one to distinguish one type of view from another).

While CALP tables provide a convenient mechanism for updating land values on a mass basis, they beg the question of how to develop and maintain them. Presumably CLT calibrated the original tables (circa 1991) by analyzing reports containing typical per-unit land values generated from vacant land sales and land residuals as described in CLT appraisal manuals. In practice, appraisers have not updated the tables since, except for the neighborhood factors provided in CALP table 6. Vacant land sales are increasingly scarce in densely populated areas of the county and land residuals are problematic due to the datedness of cost tables and difficulties in making accurate depreciation estimates.

6.3 Appraisal of 1-4 Family Residences

One to four family residential properties are currently appraised by the cost approach using the CLT costing system. Replacement cost tables provide base rates dependent on construction grade (C, C+, etc), frame or masonry construction, number of stories, and size. Prices include a

full basement, a three-fixture bathroom, kitchen sink, and a water heater[10]. Other tables provide deductions for lack of these features and additions for attics, air conditioning, additional plumbing, porches, garages, and other amenities.

Depreciation begins with the NBHD CDU (condition, desirability, and utility) rating assigned in CALP table 6. Five ratings are possible: 1 (excellent), 2 (good), 3 (average), 4 (fair), and 5 (poor). Lower numbers hold their value longer than higher numbers, that is, a 30-year old home in average condition in a "good" neighborhood will have less depreciation than a 30-year old home in average condition in a "fair" neighborhood.

Appraisers also assign an individual CDU rating to each property. Thus, a poorly maintained property in a good neighborhood may have a CDU rating of 4 or 5. The fact that it is in a good neighborhood reduces depreciation but the fact that it is poorly maintained increases depreciation. Thus, there is a family of five residential CDU tables based on overall neighborhood rating, each indexed by both actual age and eight individual CDU ratings: excellent, very good, good, average, fair, poor, very poor, and unsound. Of course, it is important for appraisers to be clear and consistent in assigning CDU ratings. Of particular importance is whether the ratings are absolute or relative to actual age (documentation appears to indicate the latter). For example, is a newly built grade C home in merely average condition (for its age) in good or very good condition because it is brand new? Similarly, what is the proper CDU for an old but well-built and well-maintained home?

There are six CDU tables for other building and yard (OBY) improvements based on type of improvement. Each contains percent good tables indexed by six CDU ratings (excellent, good, average, fair, poor, and unsound) and age.

Cost tables have not been updated since they were developed by CLT. Instead, a countywide index factor has been updated by about 5-6% per year on average. Depreciation tables were last updated in 1998-1999. Of course, appraisers can make further adjustments to improvement and OBY values through the factors provided in CALP table 6 (in practice neighborhood and OBY factors are equal).

We recommend that Fulton County gradually migrate away from a cost system for one to four family homes to a market system. While the CLT residential cost system is relatively straightforward and easy to use, like any cost system, it suffers from the necessity to "back into" market value. The system determines a land value, applies various base rates, estimates depreciation, and then applies critical neighborhood land and building factors aimed at bringing the level of appraisal for the neighborhood into the target range. In effect, the system has devolved into a neighborhood factoring approach. There appears to be little emphasis on checking for or ensuring equity among construction grades, ages, size ranges, etc. And, even if this were done, problems could not be easily addressed. This system can be expected to become increasingly problematic as markets in the county continue to shift and evolve.

[10] According to documentation, base costs also include central heating, but it is shown as an addition in the sample cost calculations that we reviewed.

A direct market approach, based on multiple regression analysis (MRA), would afford the opportunity to analyze sales directly to determine current rates and appropriate adjustments for all important value-determinants. Separate models could be developed for various "market areas" in the county based on sales from that area only. Modelers could test the models for accuracy and ensure equity among all key property characteristics. Further, once initial models were developed, they could be updated annually as needed to reflect addition of the most recent sales to the database. Factoring would be eliminated in favor or a system of current, market-derived rates and adjustments pre-tested for accuracy and consistency. Many, if not most, modern assessment offices comparable in size to Fulton County have already moved to such a system.

We are aware that the County, with assistance from CLT, attempted to implement a market approach for residential properties in 1991 (delayed until 1993) and again in 1998. Both these attempts utilized CLT's comparable sales system and (particularly the former) are perceived to have failed, in part because of the selection of inappropriate comparables. Rather than attempting to resurrect that system, we recommend that the county instead use MRA to directly estimate market values. This approach carries a number of advantages discussed in section 7 below.

6.4 Appraisal of Condominiums, Townhomes, and Lofts

Condominiums, town homes, and lofts (land use codes 106, 107, and 110) are growing rapidly and comprise an increasing share of the total tax base.

Despite the fact that these property types lend themselves particularly well to a direct market analysis, they are also appraised by the cost approach, which is particularly problematic for condominiums and lofts because of the absence of an individual land component and the difficulty of capturing common areas and other amenities. Appraisal procedures are largely the same as for other single-family properties. The property record card provides for floor level, location within the building (excellent, good, average, poor), and specific codes for waterfront, water view, and golf course view. However, these data are for information purposes only and not used in cost calculations.

At one time the county had a condo team of 2-3 persons located in the assessment standards section. The team would conduct field reviews and inspect building plans, permits and sales to ensure an accurate database. When the residential section was divided into four regions in 2000, the condo team was placed in the South Fulton district and worked with the other districts on condo valuations. The team has since been disbanded and the four residential regions appraise condos along with other residential properties in their respective areas. As with other residential properties, values are updated by manipulating land and building factors by neighborhood. Some regions seem to prefer factoring land while others factor building values or a combination of the two. Due to limitations in the neighborhood coding scheme, condos, town homes, and lofts can have the same neighborhood number as single-family residences, meaning that none can be adjusted independently of the others.

Another issue is the determination of land values, which are problematic for condos and lofts in the first place because of the absence of a physical land plot for each unit. Currently, old land values are simply carried forward or factored in an effort to help reach market values. Further,

property owners will sometimes separately challenge the land or building value. In any case, trying to rationalize land values for these property types is not a productive exercise.

As with other residential properties, we recommend that the county move to a direct sales comparison approach for condominiums, town homes, and lofts using either direct MRA or CLT's comparable sales system. Some form of the sales comparison approach is certainly preferred for these property types and is widely used in most other large assessment jurisdictions. There are at least two possibilities for addressing land values for these property types in a market approach. One is to allocate an arbitrary flat value to the land, which could vary by neighborhood or complex. The second is to allocate a percentage of the total estimated value to the land. In any case, information explaining the valuation process should make it clear that the allocation is arbitrary and that only the total value is meaningful.

6.5 Appraisal of Commercial and Industrial Land

Commercial land valuation is similar in concept but more complex than residential land valuation. It too begins with a "zone" table (table 7) indexed by city and zoning code that points to a zoning type (there are currently 31 commercial zoning types). Valuation rates are indexed by commercial neighborhood, "location" code, and land type. There are currently 109 appraiser-defined commercial neighborhoods. The commercial property record card (box 430) provides for nine location codes (CBD, major strip, secondary strip, etc). Not all apply in every neighborhood and application of each is limited to the chosen zoning types specified in table 7 (for example, CBD pricing will not apply if inconsistent with assigned zoning codes). The property record card provides for three potential land types: square feet, acreage, and gross (in practice, only the first two are used). Each will support the same pre-defined pricing options used for residential property. For example, square foot rates can vary by primary site, secondary site, residual land, waterfront, water view, undeveloped land, and common area land. Each table contains base sizes, base rates, and adjustments for differences from the base size.

Site adjustments can be applied to individual parcels using the same influence factors as for residential property (topography, shape, corner, view, etc.). The *Commercial/Industrial Review Appraisal Manual* (1999) notes that corner influence, while not applicable to residential land, may be a positive influence for commercial land.

Updating the C/I CALP tables would appear to be a daunting proposition, particularly in view of the amount of new development and the paucity of usable land sales in many areas. Commercial land was revalued in 1995. Land in the northern part of the county was updated in 2002-2003 and South Fulton was revalued during the 2005 and 2006 tax years. Land in North Fulton and the central business district is once again in need of attention.

The commercial staff can extract sales from the mainframe to a shareable network drive for personal-computer-based analyses and use Excel to analyze values and determine sales ratios. Based on the results, land tables can be updated or land factors developed by neighborhood.

6.6 Appraisal of Apartments, Commercial, and Industrial Properties

Apartments and most commercial and industrial properties are appropriately appraised using the income approach. CLT initially set up the income tables and rates used for 1992 and updated them in 1995 and again in 1998 to correspond with the mandated three-year reappraisal cycle. County staff has performed subsequent updates. CLT will perform another update for the 2008 values.

As noted, the system is designed to apply income approach models, not develop them. The system is based on a complicated table structure and analysts face a considerable job in maintaining the tables. For example, the system contains 22 model types defined on the basis of structure type and use code. Examples include low-rise (1-3 story) offices, hi-rise offices, medical offices, shopping centers, general retail, convenience marts, warehouses and light manufacturing, condo warehouses, banks, high-rise hotels/motels (4+ stories), and low-rise motels.

Each model type has a number of model numbers defined based on neighborhood. In general, the higher the model number, the more desirable the neighborhood. Low/mid-rise apartments (model type 1) have the most models (20) and service stations (model type 14) have the least, although not all models appear to have neighborhoods assigned to them.

All model types fall into one of three formats: apartment, hotel/motel, and all other. Apartment type models contain parameters for typical monthly rents by bedroom count; adjustments for more than one full bath and for half baths and fireplaces; typical expense and vacancy and collection loss ratios; age adjustments that apply to expense ratios (e.g., less than 10 years is a multiplier of 0.94 and 25-49 years is a factor of 1.06), and capitalization rates. Hotel/motel models contain average daily room rates; a ratio for food and beverage sales as a percentage of all sales; department and operating expense ratios; the typical vacancy and collection loss ratio; age factors applicable to expense ratios; and capitalization rates. All other models contain annual rental rates per square foot; optional covered and uncovered parking rents per month; expense ratios and utility expenses per square foot if applicable; age factors applicable to expenses; and capitalization rates. A separate table contains estimated effective tax rates that vary by tax district and that are added to the capitalization rate. In addition, appraisers can make adjustments to individual properties for grade, excess land, or other features that vary from what is typical for the model type and number (model parameters do not include variations in rent rates by floor area or level, which might be important for retail properties).

Appraisers calibrate income models largely from the study of published sources such as CoStar, the Institute of Real Estate Management, Korpacz, BOMA, C.B. Richard Ellis, and Dorey's Office Guide (which provides asking rents for available space in the Atlanta area). Other information is obtained during the appeals process. In 1999 the county sent out income and expense mailers to commercial property owners but the usable response rate was only about 3%. Unfortunately, Georgia statutes do not require property owners to provide such data, not even to submit an appeal.

Although the Commercial Property Division separates real estate responsibilities between a north and south branch, the two appraisal managers divide the analytical work needed to specify mod-

els by model type. In recent years they have adjusted cap rates downward in response to market trends. In addition to published cap rates, estimated net rents are compared with sales prices for this purpose (the analyses and results have not been documented).

For commercial and industrial property types (such as banks and manufacturing properties) that are not appraised on the income approach, the county uses the CLT cost approach. Calculation of RCN (replacement cost new) begins with a base rate and interior finish rate (negative adjustment if not present) based on structure code, which is then adjusted for wall type, partitions, heating, air conditioning, and plumbing to obtain a total rate per square foot. This rate is multiplied by floor area and number of stories, combined with the value of other relevant building features (elevators, canopies, loading docks, etc.), and multiplied by the grade factor to obtain RCN. Interestingly, the numerical translations of the relative worth of the various grade factors from low (D-) through very high (X+) are the same as in the residential cost system.

Depreciation begins with a determination of a numeric value (1-10) based on functional utility (none, poor, fair, normal, and good) and physical condition (poor, fair, normal, good, renovated), along with a determination of economic life based on structure code and construction type (wood frame, fire resistant, fireproof, and pre-engineered steel). A percent good factor is then determined based on building age relative to economic life and the assigned functional utility/physical condition rating (1-10). Finally, the depreciated value of any yard improvements and secondary buildings is added to obtain RCNLD (replacement cost new less depreciation).

Occasionally commercial buildings are also priced using Marshall & Swift. For the most part, the indicated values tend to be consistent with those obtained from the CLT approach.

We perceive the commercial valuation system to be basically sound. The emphasis on the income approach is appropriate and should be continued. We are disappointed by the poor response rates to income and expense mailers but note that the 2008 revaluation will include an attempt to hand-deliver questionnaires, followed by a mailer if no response is received[11]. The use of local and national published sources of information is appropriate and some larger jurisdictions have been able to build income models from data obtained from such publications matched against available property characteristics data. We recommend that the county explore the development of such models[12]. More attention can be paid to screening commercial sales and we encourage the expanded use of sales data, both to help develop capitalization rates (as currently done) and to build benchmark sales comparison models where adequate sales permit (most likely for apartment, office, and warehouse properties). Finally, the basis for income parameters (rent rates, vacancy rates, expense ratios, and capitalization rates) should be documented. For example, a booklet could be prepared each time the parameters are updated, explaining what sources were consulted, what data analyses were undertaken, and how the findings and conclusions support the chosen rates or parameters.

[11] The forms will solicit income and expense data from 2004, 2005, and 2006.

[12] Although the Commercial/Industrial Appraisal Manual states that income models can be developed though "computerized modeling software, such as the MRA module … to analyze the data", the commercial section is not aware of any such capabilities in the current system.

The county recently contracted with CLT for the 2008 commercial reappraisal. While we understand the desire for outside, independent expertise, we recommend that the county strive to develop a strong in-house appraisal capacity. Working hands-on with experienced CLT staff during the 2008 reappraisal could provide a good start in this direction.

6.7 Appraisal of Leasehold Interests

A leasehold interest is the legal right of a tenant to use a property for a stipulated time subject to specified lease payments and other terms of the lease. A leasehold interest has positive value when market rent exceeds contract rent. A leasehold interest may have no or negative value if market rent falls below contract rent. Relatively infrequent occurrence and a paucity of data complicate the appraisal of leasehold interests.

In appraisal for tax purposes appraisers normally need not distinguish between leasehold and leased fee interests (the owner or landlord's position), since the full value of the property is assessed to the owner and market rents are normally assumed. However, special cases arise when the owner is a government or other tax-exempt entity and the tenant is a private entity, such as a restaurant or retail outlet at Hartsfield airport. The first step in such cases is to determine the taxable status of the leasehold interest under Georgia statutes and case law[13]. In cases where a development authority issues bonds to acquire a facility that it will lease to a private entity, the lease payments typically amortize the bonds and the company owns the facility at the termination of the lease. To the extent that principal is amortized, the value of the leasehold interest increases annually. In other cases development authorities may enter into an agreement with the lessee for payments in lieu of taxes over a specified time period.

Thus the first step in the appraisal of leasehold interests is to examine the terms of the lease and governing statutes and case law. Unless otherwise exempted, the value of the leasehold interest is the capitalized value of market rent less contract rent and allowable expenses over the term of the lease, plus the present value of the lessee's interest, if any, at the termination of the loan. In cases where the property reverts to the government authority at the expiration of the lease, there is no reversionary value to the lessee. In cases where the lessee becomes owner, the value of the reversion can become significant as the lease matures, particularly if the lessee has a lease-purchase agreement of if payments to the government agency provide for amortization and acquisition of the property. In any case, appraisers must be diligent to determine applicable market and contract rents and study the terms of the lease to determine the lessee's rights and obligations in the property. In controversial cases, advice from the county's legal staff should be sought.

It is our opinion that the county's practices in the valuation of leasehold improvements are on a par with those of most other states where personal property is taxed, excepting perhaps California, where both the state oversight agency and the counties invest far more resources in the effort than is the case in Georgia. Given the likelihood of greater payoffs from equivalent marginal

[13] Helpful references may include Ga. Constitution, article 7, section 1, paragraph 3; Hillsborough vs. Cromwell (1946); Delta Airlines vs. Coleman (1963); DeKalb County Board of Tax Assessors vs., W.C. Harris & Co. (1981); McMillan Vs Jacobs (1982); Georgia Presbyterian Homes, Inc. vs. Decatur (1983); Hart County Board of Tax Assessors vs. Dunlap Tire & Rubber (1984); Sheet Metal Workers International Association vs. Lynn (1989); and Coweta County Board of Tax Assessors vs. Ego Products, Inc. (1999).

investments in other areas, we are disinclined to recommend major policy or procedural changes here, although improvements would be possible.

6.8 Summary of Limitations of Current System

The current system is overly reliant on the cost approach to value, which conflicts with best practices, particularly for residential properties. The cost tables that drive the system have not been updated at the detail-level, as opposed to the aggregate level, for an unacceptably long period of time. The lag in updating them is principally due to inflexibilities in the design of the system, which is oriented to applying mass appraisal models efficiently, rather than to developing such models or keeping them up to date. In some measure the updating problems appear also to reflect deficiencies in system training and support received.

The market approach capabilities in the current system are intimately tied to CLT's comparable sales system, and both (especially the latter) are associated with the problematic reassessments in 1991, 1993 and 1998. Deficiencies in implementation contributed to the problems experienced.

In any case, the credibility of the system, as well as the data maintained therein, have been degraded. The county's response to this situation was to embark on a system upgrade, which is discussed in the next section of this report.

7. COMPUTER-ASSISTED MASS APPRAISAL AND GIS

Section 6 above described the current OASIS-based CAMA system. This section focuses on the conversion to IAS and recommendations for future system enhancements.

7.1 IAS Conversion

The county's contract with CLT for implementation of IAS[14] was signed in June 2003 and, with optional renewals, runs to June 2010. IAS has a graphic user interface, runs on the county's Oracle database, and utilizes an object-oriented relational database that should facilitate queries and integrate well with GIS and other third-party software. While one will not be able to launch GIS from IAS (due to licensing issues), staff will be able to pull tabular data from IAS into GIS.

Although data conversion is complete and IAS is now operational, the data conversion was not without difficulty, and some lingering issues may still remain. The county had compiled a list of such issues requiring resolution before going live with IAS. Training is an issue, as staff reports that CLT training has thus far centered on input screens and data entry, not on model calibration and maintenance or report writing. Because of cost, little additional training is planned, although county staff will be assigned to work with CLT personnel on the commercial revaluation,

One issue will be whether IAS has the functionality to support customizations to the current system. Although CALP and other valuation tables are generally common to the two systems, the county has added a number of customizations to OASIS that, presumably, it will want to maintain in IAS as well.

It might be noted that Cobb County also has IAS and that the contract signed with CLT calls for installation of "the contractor's standard Georgia (Cobb County) version of IAS, including standard Georgia (Cobb County) report features". This language makes clear that it is incumbent on Fulton County to ensure that required functionality is preserved when different from Cobb County practices[15].

7.2 Market Area and Neighborhood Delineation

The current system has over 2,000 five-digit residential neighborhood codes that are used to develop and apply land and building factors in the cost approach. They are integrated into the current CAMA system in such a way as to make revisions to the neighborhood structure extremely difficult. As mentioned, some of these neighborhoods include both single-family homes and condominiums, making it impossible to apply separate factors to each property type. Although

[14] IAS is a set of software modules that CLT developed as a successor to its MAS system. The principal differences between the systems are that IAS is based on a relational database system (Oracle) rather than being dependent on flat files, which thereby affords better opportunities for integration, ad hoc reporting, and quality control, and IAS includes a graphical user interface, which enhances system navigation and user training at the (slight) expense of response time. The procurement of what was essentially a new system was packaged as an enhanced level of support, which doubtlessly contributed to the protracted implementation problems downstream.

[15] Forsyth County is also in the process of implementing IAS.

neighborhoods are generally combined into "neighborhood groups", these groups appear to be unused, since the county has abandoned the comparable sales algorithms that utilized them.

To address current limitations and to prepare for implementation of a market-based residential appraisal system, we recommend that the county develop a new set of codes based on a *market area and neighborhood* scheme. Market areas are relatively large geographic areas that correspond to real estate areas recognized by the local real estate community (e.g., Buckhead, etc). Typically a county the size of Fulton County might have 15 to 20 such areas. One valuation model is developed for each market area using only sales from that area. Neighborhoods constitute variables in the model. To ensure model reliability and stability a neighborhood should have a reasonably large number of properties and sales. Typically, a neighborhood would have several hundred residences, although smaller or larger areas can be accommodated. With these general guidelines in mind, neighborhoods could be based, at least in part, on exiting neighborhoods and neighborhood groups. In any case we see no good reason to try to preserve the existing system of five-digit codes. Single-family and condominiums can continue to be assigned to the same neighborhoods as long as IAS will permit them to be modeled separately (which we believe to be the case).

We recommend that the Residential Property Division first determine market area boundaries, which could be drawn so as not to overlap the four existing residential regions. Each region could then determine neighborhood boundaries.

7.3 CAMA Modeling

As discussed in section 6, we recommend that the county transition to a modeling approach using multiple regression analysis for residential properties (and eventually to income models for commercial properties where applicable). Based partly on the county's prior experiences with comparable sales procedures, we recommend that, at least for single-family properties, MRA models be applied directly to estimate property values. Besides avoiding potential problems of inappropriate comps (or comps with erroneous sales prices), this approach has the advantage of creating better parcel-to-parcel consistency in values (since the same equation is applied consistently to all properties in the market area) and stability in values from one year to the next (since it avoids issues of the selection of different comparables for the same property). [16]

Regardless of whether it takes the form of direct MRA or automated comps, the county must decide whether to model with IAS or with a third party software package, such as SPSS, with which county personnel have some familiarity. Modeling with IAS has the advantage that, once developed, models can be directly applied to value estimation. SPSS has the advantages of ease of use, flexibility, a frequently updated product cycle, and a large user base among assessment jurisdictions. A number of CLT client jurisdictions model in SPSS and, once the model is developed, replicate it in OASIS or IAS for value application purposes. We also note that IAS documentation states that it "supports third party statistical analysis interfaces such as SPSS". The

[16] Comparable sales algorithms may be better suited to condominiums where values tend to be more homogeneous, although the same caveats still apply.

transition from MAS to IAS will make MRA modeling more user-friendly than it was under the prior MAS system, although not as convenient nor as flexible as it is under SPSS.

Decisions regarding the above have obvious implications for training, that is, should modelers be trained to model in SPSS, IAS, or both. We perceive that the first will have a shorter learning curve, although modelers would still require training in the CAMA module of IAS in order to be able to replicate and apply models. We also note that the CLT contract provides that "The Contractor will provide up to four (4) weeks of Market Modeling Assistance" (Exhibit 1, page 7). Based on a consideration of the various options, we recommend that the county acquire at least four SPSS licenses (one per region) and began training and the development of pilot models and related market analyses (e.g., time trend analyses) with SPSS. This will lay the groundwork for actual implementation of models once the necessary skills are developed and it is clear that successful results can be obtained. In addition to valuation accuracy, long run benefits include the ability to update models annually if desired without reliance on a factored cost approach.

Appendices A-3 through A-6 at the end of the report contain illustrative pilot models for single-family residences in each of the four regions. The models were all calibrated with additive MRA using SPSS. They formed the basis of our initial steps in the mentoring processes called for under our contract.

In each case, using validated 2003-2005 sales we conducted exploratory data analysis, built a base model using key property characteristics, followed by a full model that tested all available characteristics, removed outliers, developed time-adjustments, built a final model using sales prices time-adjusted to January 1, 2006, and performed sales ratio analyses on the resulting values. We also tested the model on a holdout group of electronically edited sales from early 2006 and compared the results with current 2006 values. In each case the MRA models produced a far more accurate level of assessment and achieved better CODs than the current cost approach on holdout 2006 sales. While we believe that the results may by artificially good, due to the tendency in some cases to change data on sold properties, the results demonstrate that mass appraisal models based on good data can produce accurate values for most residential properties in Fulton County.

SPSS software is available in the assessor's offices as a result of prior training courses that ten people from the office took under the auspices of a distance-education program offered by the University of British Columbia. Nine of the ten trained employees are still on staff.

A final issue we raise is whether land values should be determined separately and, in effect, only building residuals modeled (as traditionally done in OASIS and IAS) or whether the total property value, as represented by sale price, should be modeled. Although this issue can be discussed during modeling training and explored during pilot models, we tend to recommend the latter approach, which allows development of a unitary value and means that modeling can begin before land values are determined. Of course, once determined, land values developed from CALP

tables can be subtracted from estimated total values to obtain building residuals and thus provide a breakout of value between land and buildings as required by Georgia law[17].

7.4 Geographic Information Systems (GIS)

The County has a modern GIS capability that makes use of ESRI's ArcGIS software (which has pretty well become the industry standard). When a new parcel is created, a matching record is constructed in GIS that can be accessed by either parcel number or book and page. The new parcels are digitized based on their legal description. Condominium units in the same complex are assigned a common land parcel and share its x-y coordinates. In GIS one sees the land parcel and associated unit numbers, each of which can be displayed from GIS. A further enhancement, of course, would be to show the footprint or physical x-y coordinates of the individual units, which would help in evaluating comparables sales in the same complex.

The GIS unit has a supervisor plus six positions (including vacancies)[18]. The supervisor and senior specialists prepare comparable sales and sales ratio thematic maps for the appraisal staff. Although licensing issues present an obvious problem, we would like to see appraisers themselves trained in and reasonably proficient with GIS software, so that they could process their own requests and free GIS staff for maintenance, support, and development work. A first step in this direction is likely the acquisition of additional user licenses, followed by selected staff training. In the longer term we would also encourage explorations by the R&D unit (see below) of the ability of the GIS to support land and locational valuation modeling. Work elsewhere has demonstrated that with the availability of GIS resources, such as the county already has, a variety of geostatistical techniques can be put in place to improve the accuracy of land valuation and to minimize its dependency on somewhat arbitrarily defined neighborhood boundaries.

7.5 Research and Development Unit

To spearhead the implementation of modeling and GIS applications, we recommend that the county establish a research and development unit of approximately five professionals and commensurate clerical support. The unit would report directly to the Assistant Chief Appraiser. It would explore the development of new methods, conduct market analyses, develop MRA models and GIS applications, conduct annual sales ratio studies, and interface with the State on their ratio studies. The head of the unit should be familiar with the CAMA state-of-the-art and the members of the unit should possess strong analytical skills

Initially the unit would focus on residential properties but could eventually also turn its attention to commercial properties, where income or sales comparison models may be possible for some property types with adequate income or sales data (as noted earlier, income data is obtained chiefly from third party sources). The unit could also research methods for the separation of total value between land and buildings for properties appraised on a sales comparison or income

[17] Other options for the separation of land and building values are also possible and can be pursued, although the method recommended here is the most common approach.

[18] The supervisor has recently taken on a new job in the county. While replacing his skills will be difficult, the county should make retention of a qualified replacement a high priority.

approach as required by Georgia law. The unit should strive to bring mass appraisal practice in Fulton County to the current state-of-the art, explore new or alternative techniques, and coordinate with the residential and commercial divisions to ensure that the county's mass appraisal system is operating effectively using modern tools and techniques.

8. PERSONAL PROPERTY ASSESSMENT

Tangible personal property is assessable in Georgia. Business personal property (machinery and equipment, furniture and fixtures, and inventories), aircraft, watercraft, and mobile homes, most of which are in mobile home parks, are taxed annually. Heavy equipment is taxed when it is sold, and timber is taxed when harvested (on the basis of scheduled values).

The State values both the real and personal property of public utility properties. It calculates an overall assessment ratio for the county. Consistent with the federal 4-R Act, if the ratio is between 0.38 and 0.42, the county can assess public utility properties at 40%. If the ratio is lower or higher, the county must use the state-calculated ratio.

In design, the basic personal property assessment system is acceptable. Annually, the assessment department sends blank business personal property tax returns (with attachments) to the previous year's personal property taxpayers. Returned declarations are logged and screened. If the return is deemed acceptable, personal property assessments are determined . Processing work peaks as the filing deadline approaches (May 31st). Appeals are processed thereafter. Currently, the work backlog precludes effective follow-up on non-declarers (such as issuing reminders) and comprehensive efforts to discover new personal property taxpayers. However, an attempt is made to field check non-declarers to cull accounts that are no longer in business at the location on record. For other non-declarers, the practice is to roll over the previous year's value without allowing any additional scheduled depreciation. A 10 percent penalty also is applied.

The declaration form and schedules appear well, if not attractively, designed. In general, personal property is valued on the basis of depreciated original costs. Property is classified according to its normal life.

A strength of the personal property assessment system has been the audit program. Personal property appraisers review personal property returns, identify questionable returns, and send them to the auditor team for possible audit. Each year each auditor selects about thirty cases for audit, including about five out-of-state audits. A number of factors are considered, including the quality of the return and likely additions to assessable property. Audits are thorough and are made by professionally qualified auditors. In addition to basic procedural documentation, a series of Excel templates has been developed.

The OASIS system has a personal property module. A reported deficiency is the inability to include the appraiser's identification in the account record. There currently is no possibility to file personal property declarations electronically. Having a system to do so would make filing more efficient and would make it possible to automate some of the tasks that create the current backlog.

Under the current system, there are no models of typical personal property holdings for common types of business. The hope is to develop them when IAS is implemented.

Before 2002, few efforts were made to canvass business properties to ensure that all personal property was being declared. In 2002, a comprehensive canvass was made. Shopping centers were canvassed in 2003, and in 2004 some secondary streets were canvassed. In 2005, efforts were made to cull the roll of non-existent businesses before conversion to IAS. Problematic businesses include home offices, those located in high-rises due to access difficulties, and warehouses.

Other standard practices include comparing the list of taxpayers to various lists of businesses, such as holders of business licenses, telephone directories, etc., to identify potential new taxpayers and defunct businesses that should be deleted from future lists of taxpayers. These techniques are little used. However, the City of Atlanta does furnish the County with a list of licensees. As noted, the new chief appraiser has asked other municipalities to inform the department about new business licensees.

Currently, there are about 30,000 taxable business personal property accounts. There are about 650 assessable watercraft and about fifty aircraft. Business personal property accounts are organized alphabetically according to the taxpayer's name, although an account number also is assigned. Appraisers are assigned approximately equal numbers of accounts.

Assigning work by alphabetical batches seems highly inefficient. Owner's name is inherently imprecise. More important, it is impossible to gain the efficiencies of assigning accounts geographically or the expertise that could be gained by assigning work by type of business. It should be acknowledged that three appraisers focus on equipment lessors (lessees may be assessed for leased equipment when the lessor is not disclosed). Appraisal assignments are rotated every two or three years, a good practice.

As is often the case, the proper assessment of leasehold improvements to real estate is problematic. Legally, they normally would be assessed as real estate. In practice, the improvements may not be picked up by the real property appraiser. Personal property appraisers may not be able to verify whether reported leasehold improvements have already been assessed. As a result, some significant leasehold improvements may go untaxed, while some may be double taxed. Improved linkages between personal property accounts and real property parcel records attendant on the replacement of the MAS system by IAS are expected to ameliorate this difficulty.

9. PROPERTY ASSESSMENT AND TAX ADMINISTRATION

9.1 Exemption Administration

Exemption administration is divided between homesteads and all others. This is acceptable because homestead exemption administration involves significant taxpayer contact (and efforts to reach out to taxpayers to explain their rights and obligations). Although the homestead exemption unit faces significant challenges, its performance has not been controversial. However, the staff—and doubtless some taxpayers—would welcome the possibility of electronic filing.

The Assessment Department has been accused of being lax in the administration of other exemptions. The department responded to charges that properties that were no longer eligible for exemptions had allegedly continued to receive them by canvassing all exempt properties. We evaluated neither the alleged abuses nor the results of the review of exempt properties. We would note, however, that the exempt property digest has been reduced in size. Whether a property or taxpayer is eligible for an exemption depends in part on clear eligibility criteria. It has been suggested that legislative standards regarding use of exempt purposes are not unambiguous. Another problem has been inexplicable reinstatement of exemptions a year or two after they were removed, suggesting that there may be system errors.

9.2 Digest Preparation and Tax Administration

The culmination of valuation and assessment activities is the preparation of the annual assessment digest, which is the basis for taxation. Related activities are submitting the digest to the Department of Revenue for approval and correcting errors in previous digests. Changes made to a digest after submission to the department are of concern to the department.

Changes may be made for several reasons: discovering omitted real and personal property, discovering real and personal properties that no longer exist, granting or denying exemptions, and so forth.[19] The Board approves all such changes. For changes in real property assessments, a "real property staff review form" has been developed. The form is computer generated, and its format varies with the type of action being requested. However, the form indicates the specific reason for the change, states the change that is requested, identifies the property and its owner, provides space for comments, and provides space for a photograph if one is available. It may provide for selected property attribute details. It also requires the names of the appraiser making the recommendation and of the appraisal manager.

The preparation of the Department of Revenue's digest approval package requires significant effort. Assessment data must be compiled for numerous statutorily mandated property categories and for each taxing district. Forms and backup detailed assessment data must balance. A counterpart activity is the issuance of assessment change notices. At present, little is done to investigate notices that are returned by the postal service as undeliverable (so-called "fly-backs").

[19] Board meeting agenda materials identify twenty-two categories of possible reasons for adding, deleting, or modifying an assessment.

There are about 25,000 of these, which is suggestive of failures to maintain taxpayer name and address information. However, many of these may be abandoned properties, which may signal over-valuation problems.

9.3 Stakeholder Relations

Effective information and assistance programs are crucial to acceptance of the property tax. It appears that the Assessment Department has missed opportunities to deal with issues raised about its performance in the recent critical external audits and to address the information needs of taxpayers and other stakeholders. Although the county does have a press office, it seems that either it was not asked to support the Department or that support was not effective. Although the Department has general communications guidelines, a general customer service section and call center facilities, taxpayers complain that they cannot reliably reach a representative of the office by telephone (often only voice mail can be reached). Further efforts to inculcate in the staff a sense of customer service and professional responsibility may be warranted.

The Department's other communications media (its website and brochures) have shortcomings. Brochures and forms (such as declarations and assessment notices) tend to be legalistic and densely written, which may intimidate some taxpayers. Photographs have been removed from some pages on the website because of being outdated (the Department hopes to acquire current imagery both for general information purposes and for verifying the accuracy of property descriptions). Even the spatial arrangement of the Assessment Department's downtown offices may be problematic from a taxpayer relations perspective. Although partly a function of building layout and security procedures, which the Department cannot control, the Department does not make it easy for taxpayers to navigate the organization to find the unit that could address their concerns. There is no central focus. Signage is not always visible or clear (until recently, the executive offices and the board room were anonymous). The homestead exemption unit is in an annex. The customer-service area, which chiefly is used by members of the real estate community to view maps and look up assessments, is so small that the two clerks that are assigned to help customers are located in an adjoining room.

Happily, the county executive, the new chair of the Board, and the new chief appraiser all recognize the importance of good stakeholder relations and want to provide better customer service and to restore trust. The head of the homestead section also seems conscious of the need for outreach.

One focus of the chief appraiser's outreach activities is to the taxing districts in the county. He wants to secure the cooperation of cities in furnishing the Department with copies of building permits and with information about new and lapsed business licenses. As noted, the former are needed to keep the property inventory up-to-date; the latter help with the discovery of personal property taxpayers.

In summary, assessment administration should be viewed as a public service function—the chief service being an equitable assessment. The Assessment Department should demonstrate at every opportunity that the tax is being impartially and equitably administered.

10. APPEAL SYSTEM

As with other facets of the Fulton County property tax system, the appeal process has been controversial, and, in our opinion, it is problematic in several respects. Cherry Bekaert & Holland (CBH) alleged that unqualified staff made unwarranted (un-reviewed/approved) changes. CBH saw a connection between some such changes and certain property tax representatives, implying that the process was corrupt. In addition, there has been a considerable backlog in appeals cases (although factors beyond the control of the Board of Assessors contribute to it).

Georgia law and the Fulton County property tax system provide several opportunities for taxpayers to challenge their assessments. The Department will entertain informal requests to "correct data errors." The first level of formal appeal is to the Board of Assessors. Thereafter, a taxpayer may appeal to the County Board of Equalization (BOE) or to an arbitrator appointed [by the court], and, finally, to the Superior Court of Fulton County. When the BOE hearing option is chosen, a three-member lay panel hears the appeal. Opinion is divided about whether lay boards are appropriately qualified to decide complex valuation issues, but we have no opinion on that question other than to note that such panels are a common element of assessment appeal systems in other jurisdictions. The arbitrator option may address the expertise issue, but it raises others. While lawyers are not involved, arbitration is far from free. Both the property owner and county select and must pay for an appraiser. They split the cost of a referee (arbitrator). (Arbitrators are paid between $130 and $275 per hour.)

10.1 System Administration

Our analysis of the administration of the appeals process is confined to activities under the purview of the Board of Assessors and the Assessment Department. An appeal to the Board of Assessors must be lodged within forty-five days of the date of an assessment notice. A taxpayer may appeal an assessment on grounds of taxability, uniformity, or value to the Board of Assessors. The appeal must be in writing (a letter, not a form). The appeal letter must state the assessment that is desired (appeals are deemed to be a "return").

10.1.1 Appeals to the Board of Assessors

The clerical staff of the Clerical and Special Properties section logs appeals in the hearing tracking system (HTS) of OASIS, acknowledges their receipt, and creates a folder.[20] The folder contains the complaint letter, a copy of the confirmation letter, a copy of the staff review form (property record), and other information. Folders are distributed to the relevant appraisal manager. A member of the appraisal staff will review the case and return the folder to the Clerical section along with a recommendation to the Board. The recommendation is documented on a real property staff review form and entered into HTS so that the recommendation can be presented to the Board for its action. Appeals are presented to the Board in batches organized by the type of action recommended. There are four categories of recommendations: (1) "Withdrawals" (where the appellant agrees with action recommended by the appraiser and the Board ac-

[20] IAS also has a hearing tracking module.

cepts the recommendation; coded WD), (2) "No Change" (where the appraiser recommends no change in the assessment; coded NC), (3) "Decrease" (coded DC), and (4) "Increase" (coded IN).

Recommendations are presented to the Board in batches by type of recommendation (within a batch, real properties are arranged in parcel number order). Ordinarily, the Board will act on the entire batch, although some properties may be returned to the staff for reconsideration and individual hearings may be granted. After minutes of the Board's actions are approved, results letters are prepared and mailed.

Decrease and increase letters are held in suspense for twenty-one days. If the appellant accepts the change, the appeal is considered closed (actually "withdrawn"). If the recommendation is not accepted or if there is no response from the appellant, the appeal is certified to the Board of Equalization.

Several aspects of this appeal process are noteworthy: The taxpayer (or its representative) is not required to adduce specific grounds for the appeal. Although the staff may contact the taxpayer or the taxpayer's representative during the course of investigating the appeal (which CBH found problematic), ordinarily there is no contact between the BOA and the taxpayer. Moreover, many appeals do not receive any attention by the Board. That is, if the appraiser's recommendation is within 10 percent of the appellant's declared value, the BOA normally accepts the recommendation. If the difference is greater, the appraiser must provide more support of her or his recommendation. Lastly, the presumption that an appeal that is denied by the BOA (a "no change" recommendation) will automatically be taken to the next level (to the Board of Equalization or to arbitration) unless it is officially withdrawn (during a twenty-one day window) is unusual. Given the judgment inherent in the appraisal process, the difficulty in justifying many existing assessments, and the lack of transparency in the process, concerns about the possibility of collusion between the appraiser and the taxpayer are warranted. Moreover, the process is labor-intensive even with a good hearing tracking module.

Although the BOA processes appeals year-round, the peak period for processing appeals to the Board of Assessors is in the forty-five day period of issuing notices. Most notices are issued on a single day. Boards of equalization also sit year around. This system of appeals (in contrast to systems that require all first-level appeals to be decided before the roll (digest) is finalized) means that taxing districts may be liable for difficult to anticipate refunds, which is one reason why the Department of Revenue examines the amount of value at risk in its digest approval process.

The BOA's informal complaint procedure also has been controversial. Although intended to address "data errors," what constitutes an error may be a matter of judgment, especially in an environment in which data are changed to obtain the desired value from the CAMA system. After a review by an appraiser, a value determination is made, and the taxpayer is notified. Such notices are automatically certified to the Board of Equalization.

10.1.2 Appeals to the Board of Equalization or Arbitration

Appeals from the Board of Assessors' decision may be made to the County Board of Equalization (BOE) within twenty-one days of the notice of the BOA's decision. Alternatively, the appellant may choose arbitration. The BOE has its own administrative procedures and staff, which generally are outside the scope of our review. Our review is confined chiefly to communications between the BOA and the BOE and to the BOA's defense of assessments before the BOE or the arbitrator (see section 10.2).

When the BOE sets a hearing schedule, a copy of the schedule is given to the Clerical Section. The section organizes appeal folders according to hearing date and time. Hearing dates and BOE case numbers are inscribed on the files, and batches of files are transmitted to the relevant appraisal manager, who must acknowledge receipt of files. Should BOE schedules change, the clerical staff attempts to coordinate the changes with the appraisers.

Either party may appeal an arbitrator's decision. Appeals from the BOE's decision may be made to superior court (based on the record established in the appeal).

As a result of the enactment of the Taxpayer's Bill of Rights, the burden of proof is on the assessor to establish that the assessment is correct. (In many jurisdictions, the burden is reversed; the appellant must prove that the assessment is incorrect under the standards that prevail in the jurisdiction.) The implication of this is that the appellant has no obligation to present evidence (although most do if an appeal to the court is contemplated). However, they may present slanted evidence. Either situation reduces the amount of information available on which to make wise decisions.

Some believe that it takes too long to process an appeal to the BOA or the BOE. Of course, delays are inevitable when there is a large number of appeals to be processed or a large number of hearings to be scheduled. One purported cause of delay at the BOA is the practice of sending appeal recommendation forms back to staff to make grammatical corrections, etc. Although we could not evaluate this issue, given the likelihood of further appeal and the fact that the burden of proof is on the assessor, careful preparation of a case makes sense (as even a minor typographical matter could be used to discredit the assessor's defense). On the other hand, efforts spent preparing for appeals that will be withdrawn may be wasteful.

As noted, the role of tax representatives in the appeal process also has been questioned. It was said that 90 percent of appeals are made by five firms, implying that they are too powerful.[21] It also is said that tax representatives file batches of protective appeals that subsequently are withdrawn, essentially wasting the resources the BOE expended in logging and researching the appeals.

Consistent with Georgia Revised Statutes 48-5-299-C, if a property is appealed to the BOE, the decision of the Board stands for the current year and two succeeding years. Unfortunately this tends to encourage appeals as the county generally cannot increase values to capture market

[21] We are unaware of data that would support the statistic.

trends as may be done for other properties of the same type in the same neighborhood. An exception may occur if there is specific evidence of an increase in value, such as an increase in asking rents, but the Board is very hesitant to depart from the 3-year rule.

10.2 Value Defense

Two aspects of the Assessment Department's value defense practices have been criticized. One criticism is a practice of having "unqualified" appraisers investigate appeals in the field and make recommendations to the BOA. Another is the practice of having a different appraiser present the Department's defense before the BOE or the superior court. Aside from issues of what constitutes a "qualified" appraiser, the merits of the criticism would depend on the nature of the appeal; in a mass appraisal system, a field investigation might serve only to verify physical facts. Having an appraiser present a case in an appeal who was not the one originally most responsible for the assessment under appeal is not uncommon. Assessment offices often assign senior appraisers with good communication skills to value defense. In addition, in a mass appraisal system, no single person is completely responsible for an assessment.

Although we could not witness any appeal presentations, we did examine a small sample of appeal dossiers (folders). The BOA has detailed clerical procedures and standards for assembling appeal dossiers. In general, the dossiers we examined complied with the standards. Valuation documentation generally included copies of the CAMA system review document and the staff review form. The former documents facts about the property and the results of calculations. The latter provides space for a narrative recommendation and a recommended value (which could be higher, lower, or the same as the current value). On occasion, the folder would include information on comparables. One commercial folder that we examined contained an appraisal commissioned by the appellant. The information available to us suggests that salient points made in defense of an assessment would be made verbally.

10.3 Conclusions

In general, we conclude that there are opportunities for improving the appeal system. At the policy level, the current appeal system favors ease of appeal over meritorious appeals. As a result, the BOA (and the BOE) must be equipped to deal with more appeals than otherwise would be the case. To minimize the possibility of unwarranted reductions in assessments, the BOA needs a valuation system that produces accurate value estimates for the vast majority of properties in the County, as well as a staff that is capable of defending the value estimates convincingly. The staff also needs a system for assessing value at risk and allocating resources accordingly. The current system apparently provides business opportunities for tax representatives and arbitrators, which has implications for the cost of assessment administration and which may have other unintended consequences.

The BOA's practice of setting a threshold for deciding whether to accept the appraiser's recommendation also may have unintended consequences. The appraiser's resolve to defend the system (valuation model) may be weakened, because acquiescing to the appellant reduces work. It may also encourage collusion, as CBH alleged. Either outcome is more likely if the appellant has no obligation to support her or his declared value. In a similar vein, an appellant may have

an incentive to commission a "low ball" appraisal in superior court, as courts tend to split the difference when both parties present a plausible case.

While we stop short of recommending legislative changes, we believe the appeal system deserves a hard look. However, the BOA could strengthen its value-defense activities. Strategies for doing this include making more information about the basis for value estimates publicly available. For example, the King County, Washington, assessment department publishes details of its valuation models on its website, as part of its efforts to comply with the Uniform Standards of Mass Appraisal Practice (USPAP). The Cook County, Illinois, assessor's office is developing semi-automated templates for producing narrative appraisals of high-value properties to better counter appraisals commissioned by appellants. Provided they are credible, ratio study statistics can be used bolster the credibility of the appraisal program and the fairness of assessments. Additionally, greater use of comparables could be made.

11. CONCLUSIONS AND RECOMMENDATIONS

11. 1 Conclusions

1. The Georgia property tax system has anachronistic elements, including requirements for taxpayer returns and management of the assessment function by a board, that are now rarely seen and appear to have contributed to a diffuse allocation of responsibility between the board and the chief appraiser.
2. The lack of continuity in management appears to have resulted in a lack of a shared vision.
3. The office's dependency on contractors or consultants has weakened the appraisal staff's ability to update valuation models (as detailed below).
4. These three factors may have contributed to lackadaisical attitudes and the lack of a culture of quality on the part of some of the staff (although by no means all of it).
5. Due to deficiencies in its software, the county has been unable to measure its own performance according to the most relevant criteria upon which it is judged.
6. Defects in the procedures used to monitor assessment performance at both the state and local level have resulted in unrealistically positive portrayals of assessment accuracy.
7. Coding of assessment data is problematic in respect of neighborhoods, land use, sale validity, and judgmental factors such as grade and condition/desirability/utility, among other characteristics.
8. There are notable differences in assessment performance among groups of property, including neighborhoods and districts; vacant land appears to be under-appraised relative to improved parcels, whether residential or commercial.
9. Even the newly installed software for monitoring assessment performance is problematic in certain respects.
10. Procedures for monitoring quality, affixing responsibility for errors, monitoring managerial statistics, and developing new procedures are lacking.
11. BOA is not under staffed in terms of gross personnel, although some changes in organizational structure are warranted.
12. Sales data are not reliably properly validated.
13. Data on building permits and related transactions are not received reliably nor in a convenient format, nor are tracking mechanisms for such data adequate.
14. Modern technology is not generally used in data collection.
15. A general recalibration of the land and cost tables has not been done since they were installed circa 1991 because of their complicated structure and because of a lack of supporting documentation and training; this delay, and the expedient solutions adopted to work around its effects, have caused a number of further problems.
16. The controversies surrounding previous reappraisals have inhibited the adoption of appropriate modern technologies. Most of those controversies are attributable to avoidable features of the methodology employed.
17. The numbers and types of property characteristics recorded for assessable residential property are generally adequate for appraisal purposes, although a few problematic areas are noteworthy, as referenced above.

18. The county has been able to update its income-approach tables, although documentation for them could be improved.
19. The current system is overly reliant on the cost approach.
20. Market modeling via MRA can be employed successfully for residential properties throughout the county, and a number of current employees can profitably receive mentoring guidance.
21. The availability of the county's GIS data on parcel locations will be advantageous in the county's modernization of its mass appraisal methodologies.
22. Personal property assessment software deficiencies include the inability to associate appraisers with accounts and to permit electronic filings, although improved linkages between real and personal property records are anticipated with the new IAS system.
23. Dubious personal property assessment practices include the assignment of accounts to appraisers alphabetically and the lack of priority given to various discovery activities.
24. Insufficient attention is paid to researching the causes for undeliverable notices of assessment changes and similar mass mailings.
25. A variety of communications failures exacerbated the controversies surrounding the assessors' office in recent months, some of which have subsequently been addressed.
26. Georgia law on property tax appeals is unusual in several respects, including not requiring appellants to provide grounds or information on appeal, placing the burden of proof on the assessor rather than the appellant, providing multiple venues of appeal, and presuming that an adjudicated value should be unchanged for a number of years; all of these increase the burden on the county's staff relative to assessors' offices in other states.
27. Previous criticisms of appeals practices to the effect that values are defended by personnel other than those responsible for setting the original assessment do not seem to us to be particularly troublesome in a mass appraisal context.
28. Certain board practices and policies in the area of appeals management reportedly have resulted in a number of firms exploiting them systematically to the detriment of both assessment equity and office morale.

11. 2 Recommendations

11. 2. 1 Recommended Policy Changes

1. The legislature and county should reconsider the concept of a BOA in contrast to a more efficient and accountable administrative structure
2. The legislature and county should require standardized permit reporting to the assessor's office (5.2)
3. The legislature and county should rationalize the appeals process
4. The legislature and its agencies should strengthen state-level oversight procedures, especially insofar as they fail to preclude the possibility of ratio studies being distorted by cherry picking and sales chasing
5. The legislature should authorize assessors to compel taxpayers to report necessary information, including standardized income and expense information. (p 57)
6. The BOA should reconsider its approach to land valuation. (sections 6.2, 6.5, and 7.2)
7. The legislature might consider reviewing the property tax appeal system (10.3)

11. 2. 2 Recommended Procedural Changes

1. Remedy assessment/sales ratio software deficiencies (see also 3.4.1)
2. Remedy ASR procedural deficiencies (sec 3.3.1)
3. Refine the LUC scheme to something supportable by the data available
4. Refine the neighborhood coding scheme to something supportable by the data available
5. Reconceptualize neighborhoods/groups.
6. Remedy the striking differences among identifiable groups/districts, etc.
7. Attend to undervaluation of land
8. Explore the possibility of developing improved CAMA models capable of reducing the relatively high coefficients of dispersion now evident for residential properties when the effects of any possible cherry picking/sales chasing are eliminated.
9. Conduct a research project to determine whether the coding of descriptive data on property characteristics has been rendered inconsistent by any prior practices of changing such data for sold properties incommensurately with changes for unsold properties.
10. Resolve deficiencies in the new IAS ASR software, either buy means of reconfiguring installation parameters or by implementing auxiliary software (3.4.1)
11. Formalized participatory strategic planning should be initiated (p 42)
12. Units of the Assessment Department should develop annual work plans encompassing strategic plan objectives, estimates of the quantity of work to be performed, the level of effort required, and scheduling issues (p 42)
13. Establish a culture of responsibility to accompany the multi-tiered review processes (p 47 and 9.3)
14. Ensure that appropriate staff are able to read deed images on networked computers (p 49)
15. Change the basis of residential valuation from cost to market (p 54)
16. Use MRA for residential market valuation rather than CLT's comparables procedure (p 55)
17. Fix the issue of land assessments for condominiums in either of two ways (6.4, p 56)
18. Strive to implement a strong in-house appraisal capability (6.6)
19. Develop income models for commercial properties (p 58)
20. Document the basis for the income models (p 58)
21. Develop market areas (7.2, p 61)
22. Improve the screening of sales by screening all sales and basing determinations of validity on objective criteria (5.1)
23. Establish procedures for the monitoring of permits through their entire life cycle, not just until notice of them is passed to the appraisal staff
24. Assign responsibility for serving as secretary to the Board to a member of chief appraiser's staff or the Operations Division
25. Explore the possibility of increasing the accessibility of GIS data to the appraisal staff and other relevant personnel (7.4)
26. Implement a research and development unit that reports directly to the chief appraiser (7.5)
27. Seek to improve the PT-61 form (5.1)
28. BOA should strengthen its value defense activities(10.3)

APPENDICES

Appendix A1 -- Ratios of Single Family Residential Assessments for 2006 to Time-adjusted, Validated, Non-Extreme Sale Prices from 2002-2006, by Neighborhood.

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
0601	0.94	0.92	1.25	0.92	1.25	1.06	0.12	3
06011	0.89	0.78	1.35	0.78	1.35	1.02	0.13	8
0602	0.87	0.77	0.98	0.72	1.06	1.01	0.10	10
06022	0.93	.	.	0.93	0.93	1.00	-	1
0603	0.90	0.85	0.95	0.85	0.95	1.01	0.06	2
0604	0.83	0.80	0.89	0.76	1.07	1.00	0.07	33
06041	0.85	.	.	0.85	0.85	1.00	-	1
06042	0.79	.	.	0.79	0.79	1.00	-	1
0605	0.84	0.76	0.90	0.72	1.00	1.01	0.08	18
0606	0.91	0.82	0.98	0.59	1.38	1.06	0.13	20
0607	0.86	0.74	0.95	0.74	0.95	1.00	0.06	6
0608	0.77	0.72	0.90	0.72	0.90	1.00	0.06	5
0609	0.87	0.82	0.90	0.74	1.04	1.00	0.06	15
06092	0.89	0.83	0.93	0.83	0.93	1.00	0.04	3
0610	0.87	0.87	0.92	0.87	0.92	1.00	0.02	3
0611	0.84	.	.	0.84	0.84	1.00	-	1
0613	0.90	0.88	0.91	0.84	1.08	1.00	0.03	13
0616	0.98	0.90	1.07	0.90	1.07	1.02	0.08	2
0618	0.88	0.59	0.91	0.59	0.91	1.04	0.10	4
0619	0.87	.	.	0.87	0.87	1.00	-	1
0620	0.92	0.89	0.94	0.89	0.94	1.00	0.02	3
0650	0.79	0.68	0.85	0.67	0.89	1.00	0.07	10
06502	0.85	.	.	0.85	0.85	1.00	-	1
0651	0.93	0.77	1.16	0.77	1.16	1.04	0.15	4
06521	0.84	0.80	0.90	0.76	0.91	1.00	0.05	9
06522	0.64	.	.	0.64	0.64	1.00	-	1
06524	0.86	.	.	0.86	0.86	1.00	-	1
0679	0.88	0.82	0.93	0.80	1.09	1.00	0.05	11
0680	0.79	0.75	0.84	0.75	0.84	1.00	0.06	2
0700	0.83	0.78	0.87	0.54	1.41	1.01	0.15	72
0701	0.83	0.80	0.86	0.71	1.00	1.00	0.07	20
0702	0.88	0.84	0.91	0.55	1.46	1.01	0.11	63
07021	0.87	0.85	0.91	0.85	0.91	1.00	0.02	4
0703	0.83	0.82	0.86	0.72	1.38	1.02	0.12	71
0704	0.83	0.80	0.85	0.66	1.05	1.00	0.07	37
0705	0.89	0.87	0.90	0.84	0.96	1.00	0.02	9
0707	0.94	0.81	1.00	0.81	1.00	1.01	0.06	7
0710	0.85	0.82	0.87	0.51	1.43	1.03	0.10	96
0711	0.89	0.84	0.91	0.67	1.16	1.01	0.08	41
0778	0.87	0.71	1.04	0.71	1.04	1.04	0.19	2
0779	0.93	0.78	1.10	0.78	1.10	1.01	0.09	4
0780	0.87	.	.	0.87	0.87	1.00	-	1
0800	0.73	0.69	0.76	0.52	0.99	1.02	0.13	49
0812	0.96	0.77	1.29	0.77	1.29	1.02	0.13	6

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
0978	0.89	0.84	0.94	0.75	1.24	1.01	0.09	36
1100	0.78	0.72	0.83	0.72	0.83	0.99	0.07	2
1101	0.91	0.88	0.94	0.77	1.10	1.01	0.07	28
11011	0.80	0.71	0.88	0.71	0.90	1.00	0.06	10
1102	0.94	0.84	1.03	0.84	1.03	1.00	0.05	5
1103	0.88	0.80	0.94	0.77	0.95	1.00	0.05	12
11042	0.84	.	.	0.84	0.84	1.00	-	1
11043	0.71	0.71	0.71	0.71	0.71	1.00	0.00	2
1105	0.90	0.86	0.92	0.77	0.98	1.00	0.04	11
11051	0.87	0.77	1.22	0.77	1.22	1.03	0.12	7
1106	0.86	0.82	0.88	0.82	0.89	0.99	0.02	10
1108	0.94	0.78	1.03	0.78	1.03	1.01	0.09	3
1110	0.81	0.68	0.93	0.68	0.93	0.99	0.16	2
11101	0.89	0.85	0.95	0.76	0.98	1.00	0.06	12
1111	0.89	0.87	0.92	0.68	1.36	1.01	0.08	105
1113	0.90	.	.	0.90	0.90	1.00	-	1
1115	0.90	0.89	0.92	0.81	0.99	1.00	0.04	30
11151	0.86	0.83	0.88	0.83	0.88	1.00	0.02	4
11152	0.82	0.76	0.86	0.76	0.86	1.00	0.03	5
11153	0.86	0.78	0.88	0.78	0.88	1.00	0.04	4
1116	0.89	0.82	0.91	0.81	0.93	1.00	0.03	10
1119	0.83	0.77	0.93	0.74	0.94	1.00	0.08	15
11191	0.85	0.82	0.87	0.77	1.01	1.00	0.04	14
1120	0.88	0.82	1.14	0.82	1.14	1.00	0.10	6
1121	0.90	0.90	0.97	0.90	0.97	1.00	0.03	3
1122	0.84	0.83	0.85	0.83	0.85	1.00	0.01	3
1123	0.82	0.78	0.91	0.69	1.01	1.01	0.08	24
11231	0.93	0.91	0.95	0.78	1.06	1.00	0.04	47
11232	0.89	0.86	0.91	0.84	0.98	1.00	0.04	18
11233	0.94	0.93	0.96	0.84	1.10	1.00	0.04	26
1124	0.89	0.86	0.94	0.73	0.95	1.00	0.05	15
1126	0.83	0.80	0.88	0.74	0.91	1.00	0.05	16
11261	0.88	0.76	0.98	0.70	1.12	1.02	0.09	11
11262	0.91	.	.	0.91	0.91	1.00	-	1
1127	1.06	.	.	1.06	1.06	1.00	-	1
11273	0.94	0.79	1.37	0.79	1.37	1.04	0.20	3
11274	0.82	0.82	0.88	0.82	0.88	1.00	0.03	3
1128	0.84	0.79	0.88	0.79	0.88	1.00	0.04	5
1129	0.80	0.79	0.84	0.77	0.93	1.00	0.04	12
11291	0.83	0.77	0.90	0.77	0.90	1.00	0.05	6
1130	0.89	0.85	0.95	0.81	1.08	1.01	0.06	12
1131	0.83	0.80	0.86	0.78	0.89	1.00	0.03	17
1132	0.82	0.79	0.84	0.72	0.89	1.00	0.04	15
1133	0.89	0.86	0.91	0.80	1.11	1.00	0.05	41
11331	0.86	0.81	0.90	0.78	0.91	1.00	0.04	9
11332	0.82	0.78	0.85	0.74	0.94	1.00	0.04	16
11333	0.79	0.78	0.87	0.78	0.87	1.00	0.04	5
1134	0.85	0.80	0.88	0.63	0.91	1.00	0.06	12
1135	0.91	0.85	0.95	0.85	0.95	1.00	0.04	3

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
11351	0.94	0.87	1.00	0.74	1.14	1.00	0.08	20
11353	1.01	.	.	1.01	1.01	1.00	-	1
1136	0.91	0.80	1.00	0.74	1.01	1.01	0.07	9
11361	0.90	0.88	1.07	0.88	1.07	1.00	0.05	7
11362	0.83	0.75	0.91	0.75	0.91	1.01	0.10	2
1137	0.89	0.83	0.96	0.83	0.96	1.00	0.04	6
1138	0.96	0.88	1.02	0.88	1.02	1.00	0.04	8
1139	0.88	0.79	1.05	0.79	1.05	1.00	0.06	8
1140	0.85	0.82	0.87	0.73	0.94	1.01	0.05	17
1141	0.87	0.80	1.04	0.80	1.04	1.00	0.06	8
1142	0.89	.	.	0.89	0.89	1.00	-	1
1143	0.94	0.90	0.95	0.70	1.14	1.01	0.07	17
1144	0.82	.	.	0.82	0.82	1.00	-	1
1178	0.87	0.81	0.93	0.79	0.95	1.00	0.05	9
1179	0.81	0.76	0.88	0.76	0.94	1.00	0.06	14
1180	0.84	0.76	0.90	0.76	0.90	1.00	0.05	8
1181	0.84	0.80	0.88	0.76	0.90	1.00	0.04	15
1182	0.83	0.77	1.06	0.77	1.06	1.01	0.11	9
11821	0.80	0.73	0.88	0.73	0.88	1.01	0.09	2
1183	0.88	.	.	0.88	0.88	1.00	-	1
1185	0.84	0.84	0.91	0.84	0.91	1.00	0.02	4
1187	0.84	0.80	0.88	0.80	0.88	1.01	0.05	2
1190	0.90	.	.	0.90	0.90	1.00	-	1
1191	0.87	0.83	0.97	0.83	0.97	1.00	0.05	6
1192	0.87	0.79	0.96	0.79	0.96	1.00	0.10	2
1193	0.93	0.86	1.00	0.86	1.00	1.01	0.07	2
1194	0.82	0.76	0.87	0.76	0.87	1.00	0.05	3
1196	0.90	0.86	0.97	0.86	0.97	1.00	0.05	4
1197	0.85	.	.	0.85	0.85	1.00	-	1
11971	0.92	0.89	0.94	0.87	0.98	1.00	0.03	10
11972	0.83	0.66	0.89	0.52	1.27	1.05	0.16	19
1198	0.85	0.82	0.88	0.81	0.90	1.00	0.02	10
12002	0.87	0.82	0.92	0.76	1.18	1.02	0.09	18
12003	0.84	0.84	0.85	0.84	0.85	1.00	0.00	2
12012	0.82	0.80	0.91	0.80	0.91	1.00	0.05	3
12021	0.85	0.80	1.04	0.80	1.04	1.00	0.06	7
1203	0.86	0.76	0.86	0.76	0.86	1.00	0.04	3
1204	0.83	0.82	0.84	0.82	0.84	1.00	0.01	2
1205	0.82	0.78	0.86	0.78	0.86	1.00	0.03	7
1206	0.90	0.85	0.93	0.80	0.97	1.00	0.05	25
1207	0.85	0.82	0.88	0.79	1.31	1.02	0.07	15
12071	0.86	.	.	0.86	0.86	1.00	-	1
1208	0.93	.	.	0.93	0.93	1.00	-	1
1209	0.86	0.81	0.88	0.81	0.88	1.00	0.03	3
1210	0.86	0.85	0.87	0.85	0.87	1.00	0.01	2
1211	0.83	0.80	0.87	0.80	0.87	1.00	0.04	2
1213	0.91	0.88	1.00	0.88	1.00	1.00	0.04	8
1215	0.90	0.88	0.94	0.82	1.15	1.01	0.05	32
1216	0.81	0.69	0.88	0.62	0.99	1.02	0.10	9

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
1218	0.82	0.80	0.85	0.71	0.91	1.00	0.04	20
1219	0.84	0.81	0.88	0.68	1.07	1.00	0.07	26
1221	0.88	0.75	0.95	0.75	0.95	1.00	0.07	6
1222	0.82	0.76	0.87	0.66	1.06	1.00	0.08	24
12221	0.91	0.78	0.99	0.78	0.99	1.00	0.05	8
12222	0.84	0.78	0.92	0.71	0.99	1.00	0.07	13
1223	0.91	0.87	1.00	0.84	1.20	1.00	0.07	9
12231	0.80	0.66	0.84	0.66	0.84	1.01	0.06	5
1224	0.91	0.88	0.94	0.81	0.96	1.00	0.04	9
1225	0.96	0.90	1.01	0.85	1.06	1.00	0.06	12
1226	0.81	0.75	0.93	0.66	0.95	1.00	0.10	11
1227	0.80	0.75	0.92	0.66	1.13	1.00	0.11	22
1228	0.82	0.78	0.90	0.66	1.01	1.00	0.07	13
1229	0.86	.	.	0.86	0.86	1.00	-	1
1230	0.80	0.76	0.86	0.68	1.01	1.00	0.07	19
12301	0.84	0.80	0.91	0.80	0.91	1.00	0.05	6
1231	0.87	0.80	0.90	0.80	0.90	1.00	0.03	5
1232	0.83	0.80	0.89	0.80	0.89	1.00	0.03	8
12321	0.94	0.80	0.95	0.80	0.95	1.00	0.05	3
12322	0.87	0.83	0.94	0.77	1.15	1.00	0.08	29
12323	0.86	0.83	0.93	0.75	0.98	1.00	0.05	12
1233	0.97	.	.	0.97	0.97	1.00	-	1
1234	0.79	0.73	0.89	0.66	1.00	1.01	0.09	24
12341	0.80	0.72	0.97	0.72	0.97	1.01	0.10	4
12342	0.81	.	.	0.81	0.81	1.00	-	1
12351	0.80	0.67	0.92	0.67	0.92	1.05	0.10	4
1236	0.93	0.90	0.96	0.90	0.96	1.00	0.03	2
1237	0.86	0.82	0.90	0.73	1.02	1.01	0.07	24
1238	0.83	0.80	0.90	0.66	0.98	1.01	0.07	17
12382	0.89	0.86	0.91	0.79	0.98	1.01	0.04	21
1239	0.81	0.76	1.32	0.73	1.48	1.05	0.20	11
1240	0.85	0.75	1.01	0.75	1.01	1.01	0.05	7
1241	0.83	0.73	0.92	0.73	0.92	1.01	0.12	2
12411	0.84	0.77	0.90	0.74	1.04	1.01	0.09	17
1242	0.86	0.79	0.90	0.60	0.94	1.00	0.08	12
1244	0.93	0.88	1.06	0.70	1.09	1.01	0.08	10
1245	0.84	0.66	0.94	0.66	0.94	1.01	0.10	5
12451	0.95	0.79	1.03	0.79	1.03	1.01	0.08	4
1246	0.91	0.85	0.97	0.76	1.14	1.01	0.09	24
12461	0.81	0.77	0.89	0.73	0.99	1.01	0.06	13
12463	0.75	.	.	0.75	0.75	1.00	-	1
12464	0.97	0.89	1.06	0.89	1.06	0.99	0.08	2
12465	0.81	.	.	0.81	0.81	1.00	-	1
12466	0.78	0.74	0.95	0.74	0.95	1.01	0.10	5
12467	0.83	0.81	0.92	0.81	0.92	1.00	0.05	3
12468	0.87	0.86	0.90	0.86	0.90	1.00	0.02	4
12469	0.91	0.79	0.96	0.79	0.96	1.00	0.06	6
1247	0.77	0.70	0.87	0.70	0.87	1.01	0.07	3
12471	0.77	0.74	0.78	0.74	0.78	1.00	0.02	4

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
1250	0.85	0.82	0.89	0.74	1.11	1.00	0.06	26
12502	0.85	0.83	0.94	0.83	0.94	1.00	0.04	3
1251	0.81	0.73	0.87	0.73	0.93	1.01	0.07	10
1252	0.81	0.77	0.84	0.65	0.95	1.00	0.07	35
12521	0.84	0.78	0.92	0.77	1.01	1.01	0.07	9
1253	0.70	.	.	0.70	0.70	1.00	-	1
1254	0.81	0.78	0.92	0.71	1.15	1.01	0.09	16
1255	0.83	0.73	1.39	0.68	1.42	1.08	0.23	11
1256	0.90	0.87	0.94	0.57	1.14	1.01	0.09	40
12561	0.84	0.76	0.88	0.67	1.03	1.01	0.07	10
12562	0.93	0.86	1.04	0.86	1.04	1.00	0.04	8
12563	0.86	0.82	0.95	0.82	0.95	1.00	0.04	5
1258	0.89	0.79	1.01	0.79	1.01	1.01	0.06	8
12581	0.94	0.88	1.08	0.88	1.08	1.00	0.05	6
1260	0.87	0.77	0.95	0.77	0.95	1.01	0.07	3
1261	0.85	0.82	0.88	0.69	1.08	1.01	0.08	45
1262	0.85	0.74	0.96	0.73	0.99	1.02	0.08	11
1265	1.02	0.89	1.04	0.89	1.04	1.00	0.05	4
1266	0.92	0.86	1.01	0.86	1.01	1.00	0.05	7
12661	0.96	.	.	0.96	0.96	1.00	-	1
12662	0.89	0.85	0.91	0.78	1.16	1.01	0.06	25
1267	0.78	0.78	0.79	0.78	0.79	1.00	0.01	2
1269	0.89	0.81	0.96	0.81	0.96	1.00	0.05	5
1272	0.90	.	.	0.90	0.90	1.00	-	1
1274	0.90	0.73	0.97	0.73	0.97	1.01	0.06	5
1275	0.89	0.79	0.96	0.79	0.96	1.00	0.04	5
1276	0.90	0.86	0.97	0.86	0.97	1.00	0.03	7
1280	0.86	0.83	0.94	0.81	0.95	1.00	0.05	9
1281	0.82	0.77	0.87	0.77	0.87	1.00	0.04	5
1282	0.86	0.85	0.91	0.77	0.94	1.00	0.04	9
12821	0.95	0.83	0.99	0.83	0.99	1.00	0.05	5
1284	0.95	0.93	0.97	0.93	0.97	1.00	0.02	2
1285	0.89	.	.	0.89	0.89	1.00	-	1
1286	0.86	0.76	0.89	0.76	0.89	1.00	0.05	3
1287	0.81	.	.	0.81	0.81	1.00	-	1
1289	0.84	0.76	1.00	0.76	1.00	1.00	0.07	5
1290	0.90	0.81	0.98	0.81	0.98	1.01	0.06	3
12901	0.88	.	.	0.88	0.88	1.00	-	1
12902	0.86	0.72	0.90	0.72	0.90	1.00	0.07	6
1291	0.92	0.82	0.94	0.82	0.94	1.00	0.05	4
1292	0.82	.	.	0.82	0.82	1.00	-	1
1293	0.85	0.69	0.86	0.69	0.86	1.01	0.06	3
1294	0.88	0.86	0.93	0.83	0.95	1.00	0.04	13
1297	0.96	0.93	0.99	0.81	1.22	1.00	0.05	41
1299	1.02	1.00	1.04	1.00	1.04	1.00	0.01	5
1300	0.84	0.80	0.88	0.74	1.01	1.00	0.06	25
13002	0.86	0.84	0.97	0.84	0.97	1.00	0.05	3
1301	0.86	0.77	0.92	0.77	0.92	1.00	0.05	5
1303	0.82	0.77	0.87	0.70	1.44	1.02	0.13	28

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
1304	0.90	0.84	0.95	0.84	0.95	1.00	0.06	2
1305	0.81	0.77	0.85	0.77	0.85	1.00	0.03	3
1306	0.84	0.75	1.15	0.75	1.15	1.01	0.09	7
1307	0.86	0.78	0.90	0.70	1.12	1.01	0.08	18
1308	0.88	0.72	1.29	0.72	1.29	1.03	0.13	8
1309	0.81	0.79	0.86	0.79	0.86	1.00	0.03	3
1310	0.83	0.75	1.06	0.75	1.06	1.01	0.12	6
1316	0.86	0.73	0.96	0.73	0.96	1.00	0.07	5
1317	0.85	0.75	0.97	0.75	0.97	1.00	0.06	7
1318	0.83	0.73	1.06	0.70	1.17	1.02	0.13	11
1319	0.79	0.76	0.95	0.64	1.30	1.01	0.14	21
1320	0.85	.	.	0.85	0.85	1.00	-	1
1321	0.87	0.79	0.93	0.59	1.09	1.00	0.13	37
1322	0.67	0.62	0.72	0.62	0.72	1.01	0.07	2
1323	0.84	0.78	0.92	0.78	0.92	1.00	0.05	3
1325	0.88	0.82	0.93	0.57	1.27	1.00	0.11	37
1326	0.85	.	.	0.85	0.85	1.00	-	1
1328	0.84	0.74	0.89	0.72	0.98	1.01	0.07	11
1329	0.85	0.79	1.20	0.79	1.20	1.03	0.14	4
1378	0.86	.	.	0.86	0.86	1.00	-	1
1379	0.82	0.77	0.87	0.74	0.88	1.00	0.05	9
1380	0.86	.	.	0.86	0.86	1.00	-	1
1381	0.84	0.82	0.86	0.74	0.94	1.00	0.04	39
1382	0.88	0.86	1.12	0.86	1.12	1.01	0.07	8
1383	0.82	0.78	0.86	0.75	0.89	1.00	0.04	13
1384	0.82	0.80	0.84	0.72	1.32	1.03	0.12	49
1385	0.83	0.82	0.83	0.82	0.83	1.00	0.01	2
1386	0.85	0.84	0.85	0.75	0.96	1.00	0.03	90
1400	0.89	0.87	0.92	0.71	1.36	1.03	0.09	14
1401	0.94	0.89	1.09	0.87	1.44	1.02	0.10	24
14011	0.89	0.83	1.38	0.83	1.38	1.03	0.12	8
14012	0.94	0.89	1.35	0.89	1.35	1.04	0.13	4
14013	1.04	0.80	1.16	0.80	1.16	1.00	0.09	7
1402	0.93	0.71	1.28	0.64	1.30	1.04	0.13	11
1403	0.90	0.88	0.93	0.63	1.46	1.03	0.11	24
1404	0.86	0.82	0.90	0.51	1.48	1.04	0.17	111
14042	0.87	0.84	0.92	0.59	1.49	1.04	0.15	87
1405	0.90	0.85	0.93	0.54	1.49	1.04	0.16	58
1406	0.88	0.79	0.92	0.74	1.10	1.01	0.08	25
14061	0.80	0.77	0.91	0.71	1.16	1.02	0.11	24
14062	0.88	0.76	0.90	0.70	1.24	1.03	0.10	10
14063	0.84	0.77	1.02	0.76	1.20	1.02	0.12	13
14064	0.79	0.75	1.06	0.69	1.08	1.02	0.13	10
14065	0.89	0.84	1.07	0.69	1.35	1.03	0.13	13
14066	0.88	0.86	0.88	0.86	0.88	1.00	0.01	3
1407	0.91	0.89	0.94	0.87	1.35	1.00	0.06	14
1408	0.90	0.89	1.31	0.81	1.47	1.04	0.14	9
14081	0.89	0.78	1.02	0.78	1.02	1.01	0.06	5
14082	0.86	0.60	0.92	0.60	0.92	1.02	0.10	4

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
14083	0.89	0.89	1.09	0.89	1.09	1.00	0.05	5
1409	0.90	0.87	0.93	0.74	1.08	0.99	0.06	32
14091	0.89	0.85	0.99	0.79	1.08	1.01	0.06	10
1410	0.91	0.89	0.93	0.54	1.49	1.03	0.13	130
1411	0.91	0.87	0.95	0.59	1.48	1.02	0.13	26
1412	0.91	0.88	0.93	0.74	1.41	1.01	0.10	61
14121	0.90	0.81	1.04	0.69	1.19	1.02	0.14	19
1413	0.79	0.76	0.86	0.76	0.86	1.00	0.04	3
1414	0.92	0.89	0.94	0.58	1.38	1.01	0.10	54
1415	0.81	0.72	0.91	0.54	1.26	1.02	0.16	23
1416	0.94	0.91	0.96	0.86	1.40	1.00	0.08	24
14161	0.92	0.91	0.95	0.70	1.50	1.00	0.09	50
14162	0.94	0.91	1.15	0.91	1.15	1.01	0.06	5
14163	0.93	0.90	0.99	0.71	1.23	1.01	0.09	21
1417	0.92	0.79	1.04	0.79	1.04	1.02	0.09	4
14171	0.87	0.81	1.09	0.80	1.15	1.02	0.12	9
14172	0.92	0.85	1.01	0.74	1.37	1.02	0.15	23
1418	0.85	0.68	1.01	0.67	1.06	1.00	0.13	10
14181	0.76	0.74	0.95	0.66	1.13	1.01	0.13	9
14182	1.08	0.83	1.47	0.83	1.47	1.04	0.13	6
1419	0.88	0.74	0.93	0.74	0.93	1.01	0.05	8
1420	0.87	0.75	1.03	0.75	1.03	0.99	0.09	8
1421	0.91	0.87	0.94	0.63	1.45	1.02	0.13	54
1422	0.90	0.87	0.95	0.58	1.04	1.00	0.06	21
1423	0.93	0.90	0.94	0.60	1.45	1.02	0.11	65
1424	0.90	0.88	0.93	0.66	1.47	1.01	0.11	58
1425	0.90	0.89	0.91	0.69	1.39	1.01	0.07	122
14251	0.89	0.86	0.95	0.73	1.05	1.01	0.07	20
14261	0.92	0.90	0.93	0.62	1.42	1.01	0.08	168
1427	0.91	0.86	0.94	0.75	1.38	1.04	0.12	37
14271	0.82	.	.	0.82	0.82	1.00	-	1
14274	0.90	0.85	0.95	0.80	1.09	0.99	0.06	16
14275	0.88	0.81	0.99	0.61	1.38	1.05	0.17	26
14276	0.84	0.80	0.90	0.77	1.04	1.01	0.08	15
14277	0.82	0.69	1.25	0.69	1.25	1.00	0.18	7
1428	0.89	0.82	0.91	0.62	1.46	1.03	0.13	50
14281	0.91	0.89	0.97	0.61	1.18	1.01	0.09	32
14282	0.95	0.90	1.00	0.71	1.34	1.01	0.09	20
14283	0.89	0.86	0.91	0.57	1.49	1.02	0.14	55
14284	0.89	0.82	0.93	0.51	1.43	1.01	0.12	29
1429	0.88	0.76	0.96	0.65	1.48	1.04	0.14	12
14291	0.92	.	.	0.92	0.92	1.00	-	1
1430	0.92	0.75	1.00	0.75	1.00	1.01	0.07	7
1431	0.89	0.87	0.91	0.60	1.34	1.00	0.09	63
14311	0.91	0.85	0.95	0.68	1.49	1.00	0.09	26
1432	0.95	0.88	1.01	0.84	1.14	1.00	0.08	12
14321	0.96	0.90	1.30	0.90	1.30	1.01	0.09	6
14322	0.90	0.87	1.49	0.87	1.49	1.02	0.16	6
1434	0.91	0.85	0.94	0.69	1.06	1.01	0.07	19

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
14342	0.92	0.83	1.48	0.83	1.48	1.06	0.16	7
14343	0.88	0.82	0.94	0.82	0.94	1.00	0.04	5
1435	0.95	0.87	0.98	0.79	1.14	1.00	0.06	9
14351	0.90	0.83	0.94	0.81	0.94	1.02	0.04	10
1436	0.87	0.85	1.34	0.81	1.43	1.05	0.15	9
14362	0.88	0.64	0.95	0.51	1.15	1.01	0.13	13
14363	0.88	0.74	1.22	0.74	1.22	1.00	0.12	7
1438	0.94	0.88	0.96	0.82	1.38	1.01	0.09	17
1439	0.88	0.85	0.92	0.81	1.41	1.04	0.13	19
1440	0.92	0.88	0.96	0.61	1.44	1.04	0.15	64
1441	0.86	0.81	0.90	0.70	1.39	1.03	0.13	29
1442	0.81	0.78	0.89	0.55	1.25	1.03	0.13	33
14421	0.83	0.77	0.95	0.75	1.07	1.02	0.09	12
1443	0.83	0.79	0.91	0.53	1.33	1.04	0.16	28
14431	0.86	0.82	0.94	0.82	0.94	1.00	0.03	6
1444	0.89	0.87	0.92	0.56	1.48	1.02	0.12	65
1445	0.91	0.86	0.94	0.67	1.48	1.03	0.12	36
1446	0.89	0.84	0.98	0.67	1.48	1.04	0.16	26
1447	0.90	0.89	0.91	0.55	1.49	1.03	0.14	170
14471	0.93	0.84	1.17	0.83	1.47	1.03	0.13	14
14472	0.83	0.71	1.47	0.71	1.47	1.05	0.22	5
14473	0.81	.	.	0.81	0.81	1.00	-	1
14474	0.90	0.83	0.94	0.76	1.38	1.01	0.11	22
14475	0.91	0.90	0.94	0.72	1.43	1.03	0.13	47
1449	0.87	0.85	0.90	0.85	0.90	1.00	0.02	3
1450	0.90	0.88	0.92	0.75	1.42	1.02	0.09	55
14501	0.94	0.90	0.96	0.65	1.49	1.02	0.11	85
1451	0.84	0.78	0.92	0.57	1.44	1.03	0.18	23
14521	1.00	.	.	1.00	1.00	1.00	-	1
1453	0.90	0.88	0.92	0.68	1.44	1.00	0.08	92
1454	0.89	0.80	0.94	0.80	0.98	1.01	0.06	11
1455	0.92	0.89	0.96	0.73	1.29	1.01	0.09	42
14551	0.92	0.88	0.95	0.76	1.29	1.02	0.08	29
1456	0.87	0.82	0.93	0.57	1.43	1.02	0.18	47
14561	0.88	0.85	1.00	0.81	1.05	1.01	0.06	14
1457	0.93	0.80	1.05	0.64	1.30	1.02	0.13	12
1458	0.88	0.79	1.00	0.79	1.00	1.00	0.08	5
14581	0.87	0.71	0.92	0.53	1.07	1.04	0.11	10
1459	0.90	0.85	0.93	0.72	1.45	1.01	0.08	41
14591	0.92	0.85	0.96	0.85	0.96	1.00	0.03	8
1460	0.90	0.86	0.91	0.81	1.32	1.01	0.07	20
1461	0.93	0.90	0.99	0.80	1.50	1.03	0.12	17
1462	0.79	.	.	0.79	0.79	1.00	-	1
1463	0.90	.	.	0.90	0.90	1.00	-	1
1464	0.87	0.83	0.91	0.83	0.91	1.00	0.04	2
1465	0.89	0.82	0.94	0.58	1.21	1.02	0.09	19
14651	0.85	0.82	1.45	0.82	1.45	1.03	0.14	6
1466	0.89	0.83	0.95	0.65	1.38	1.00	0.12	21
1467	0.92	0.90	0.94	0.55	1.49	1.01	0.09	84

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
1468	0.91	0.84	0.93	0.79	1.46	1.02	0.12	16
14681	0.89	0.85	0.92	0.71	1.50	1.02	0.10	39
1469	0.86	0.84	0.89	0.63	1.03	1.00	0.07	64
14691	0.89	0.86	0.92	0.82	1.01	1.00	0.05	20
14692	0.94	0.90	1.15	0.81	1.49	1.01	0.14	12
1470	0.88	0.82	0.96	0.56	1.42	1.03	0.11	13
1471	0.89	0.84	1.37	0.84	1.37	1.02	0.08	8
1472	0.98	0.88	1.02	0.88	1.02	1.00	0.04	5
14721	0.96	0.82	1.10	0.82	1.10	1.00	0.07	6
14741	0.92	0.83	1.24	0.83	1.24	1.01	0.08	7
14742	0.92	0.84	1.40	0.84	1.40	1.03	0.12	5
1476	0.93	0.90	0.94	0.54	1.47	1.02	0.14	97
14761	0.89	0.81	0.96	0.81	0.96	1.00	0.05	5
1477	0.90	0.86	0.92	0.74	1.44	1.00	0.10	38
14771	0.91	0.86	0.95	0.74	1.47	1.01	0.13	39
1478	0.90	0.89	0.93	0.64	1.42	1.01	0.09	74
1479	0.94	0.91	0.99	0.76	1.41	1.02	0.11	33
1480	0.93	0.88	0.96	0.54	1.30	1.01	0.11	36
14801	0.92	0.91	0.95	0.58	1.40	1.02	0.11	63
14802	0.88	0.84	1.37	0.84	1.37	1.09	0.15	4
14811	0.90	0.82	0.94	0.51	1.23	1.01	0.12	18
1482	0.90	0.88	0.98	0.78	1.28	1.01	0.07	11
1483	0.75	0.69	0.80	0.69	0.80	1.00	0.07	2
1484	0.88	0.82	0.92	0.76	0.96	0.99	0.05	9
1485	0.91	0.86	0.96	0.73	1.42	1.03	0.13	21
14851	0.86	0.79	1.44	0.79	1.44	1.07	0.21	7
1487	0.88	0.79	0.94	0.70	1.27	1.02	0.13	15
1488	0.85	0.80	0.92	0.80	0.92	1.00	0.04	4
1494	0.90	0.86	0.93	0.68	1.42	1.01	0.09	32
14941	0.87	0.85	0.88	0.72	1.30	1.01	0.08	50
1495	0.90	0.88	0.95	0.85	1.32	1.01	0.07	11
14951	0.86	0.84	0.88	0.84	0.88	1.00	0.02	4
14952	0.82	0.76	0.89	0.76	0.89	1.00	0.05	3
1496	0.93	0.91	0.98	0.80	1.30	1.01	0.10	21
1497	0.85	0.77	0.88	0.77	0.88	1.00	0.04	4
1498	0.86	0.57	1.18	0.57	1.18	1.03	0.15	6
1499	0.89	0.84	0.94	0.84	0.94	1.00	0.03	5
1700	0.78	0.71	0.82	0.66	1.02	1.00	0.08	21
17001	0.76	0.67	0.78	0.67	0.78	1.00	0.04	8
1701	0.87	0.82	0.93	0.56	1.32	1.03	0.13	23
1702	0.87	0.82	0.90	0.60	1.15	1.01	0.10	32
17021	0.85	0.79	0.92	0.55	1.00	1.00	0.09	9
17022	0.88	0.67	0.97	0.67	0.97	0.99	0.07	7
1703	0.83	0.79	0.88	0.79	0.88	0.99	0.05	4
17034	0.84	0.54	0.88	0.54	0.88	1.05	0.14	3
1704	0.79	0.78	0.87	0.78	0.87	1.00	0.04	3
1708	0.87	0.81	0.92	0.74	1.43	1.01	0.10	31
1709	0.89	0.85	0.91	0.68	1.25	1.01	0.09	60
17096	0.85	0.83	0.88	0.83	0.88	1.01	0.03	2

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
17098	0.87	0.86	0.89	0.86	0.89	1.00	0.01	3
1710	0.87	0.84	0.95	0.72	1.16	1.00	0.09	17
1711	0.86	0.82	0.93	0.73	1.00	1.02	0.07	26
17112	0.85	0.83	0.89	0.83	0.89	1.00	0.02	3
17113	0.85	0.80	0.91	0.71	1.03	1.00	0.08	12
1712	0.85	0.79	0.90	0.73	1.00	1.00	0.07	24
17121	0.85	0.84	0.87	0.80	0.99	1.00	0.03	13
17124	0.93	.	.	0.93	0.93	1.00	-	1
17127	0.87	.	.	0.87	0.87	1.00	-	1
17128	0.87	0.86	0.88	0.86	0.88	1.00	0.01	2
1713	0.88	0.86	0.89	0.67	1.26	1.00	0.06	47
17131	0.87	.	.	0.87	0.87	1.00	-	1
17133	0.89	0.87	0.91	0.86	1.04	0.99	0.03	11
17134	0.93	0.86	1.00	0.86	1.00	0.99	0.07	2
17135	0.90	0.86	1.03	0.86	1.03	1.00	0.04	7
17137	0.91	0.90	0.92	0.68	1.05	1.00	0.04	17
17138	0.83	.	.	0.83	0.83	1.00	-	1
17142	0.88	0.85	0.88	0.56	1.41	1.00	0.08	72
17146	0.86	0.84	0.90	0.84	0.90	1.00	0.02	3
17147	0.87	0.84	0.89	0.70	1.03	0.99	0.05	32
17148	0.93	0.84	0.95	0.84	0.95	1.00	0.03	4
1716	0.89	0.87	0.90	0.74	1.43	1.02	0.07	56
17161	0.93	0.90	0.97	0.90	0.97	0.99	0.04	2
17162	0.88	0.86	0.90	0.86	0.90	1.00	0.01	5
17165	0.89	0.87	0.90	0.81	0.90	1.00	0.02	14
17166	0.93	0.87	0.95	0.87	0.95	1.01	0.03	3
1718	0.82	0.79	0.89	0.68	0.92	0.99	0.06	14
17182	0.95	.	.	0.95	0.95	1.00	-	1
17183	0.85	0.80	0.95	0.62	1.02	1.05	0.08	11
1720	0.93	0.91	0.99	0.81	1.21	1.01	0.08	29
17201	0.92	0.85	1.05	0.85	1.05	1.02	0.07	8
1721	0.85	0.83	0.89	0.74	0.97	1.00	0.05	17
1722	0.87	0.83	0.88	0.83	0.88	1.01	0.02	3
17221	0.87	0.69	0.94	0.67	0.94	1.01	0.10	9
1723	0.88	0.80	0.91	0.74	1.03	1.00	0.06	16
17232	1.00	0.80	1.49	0.80	1.49	1.05	0.16	6
17233	0.94	0.85	1.04	0.85	1.04	1.02	0.10	2
17234	0.83	.	.	0.83	0.83	1.00	-	1
17235	1.05	.	.	1.05	1.05	1.00	-	1
17236	0.82	0.81	1.01	0.81	1.01	1.00	0.08	3
17237	0.86	0.85	0.93	0.85	0.93	1.00	0.03	3
17239	0.88	0.80	0.97	0.80	0.97	1.00	0.05	8
1724	0.90	0.84	0.97	0.78	1.13	1.02	0.08	19
17244	0.97	.	.	0.97	0.97	1.00	-	1
1725	0.90	0.88	0.93	0.81	1.06	1.01	0.05	23
1726	0.78	0.75	0.93	0.75	0.93	1.01	0.08	6
1727	0.93	.	.	0.93	0.93	1.00	-	1
1728	0.90	0.85	0.95	0.77	1.37	1.01	0.11	26
1729	0.90	0.77	0.93	0.77	0.93	0.99	0.05	5

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
1730	0.86	0.80	0.92	0.76	1.03	1.00	0.07	12
17302	0.83	.	.	0.83	0.83	1.00	-	1
1731	0.82	0.64	1.11	0.64	1.11	1.00	0.10	8
1732	0.79	0.71	1.31	0.71	1.31	1.02	0.17	7
17321	0.95	.	.	0.95	0.95	1.00	-	1
1733	0.88	0.83	0.93	0.83	0.93	1.02	0.05	2
17331	0.98	0.92	1.05	0.92	1.05	0.99	0.07	2
17332	0.89	.	.	0.89	0.89	1.00	-	1
17337	0.88	.	.	0.88	0.88	1.00	-	1
1734	0.87	0.78	0.95	0.77	1.06	1.01	0.08	9
17343	0.83	.	.	0.83	0.83	1.00	-	1
1735	0.79	0.66	0.81	0.65	0.86	1.00	0.05	10
1736	0.86	0.69	0.92	0.58	1.06	1.00	0.13	16
1738	1.01	0.90	1.12	0.79	1.45	1.04	0.15	32
1739	0.84	0.80	0.87	0.62	1.46	1.05	0.12	33
1740	0.84	0.81	0.95	0.80	1.25	1.01	0.10	9
1741	1.03	0.80	1.38	0.72	1.47	1.05	0.21	11
17411	0.88	0.81	0.89	0.81	0.89	1.00	0.03	7
1742	0.91	0.88	0.95	0.88	0.95	1.01	0.04	2
1744	0.83	0.78	0.86	0.66	1.43	1.02	0.13	31
17441	0.87	0.84	0.94	0.83	1.38	1.02	0.09	12
1745	0.90	0.54	1.16	0.54	1.16	1.05	0.14	7
1746	0.91	0.90	0.91	0.90	0.91	1.00	0.00	2
17491	0.83	.	.	0.83	0.83	1.00	-	1
1751	0.91	.	.	0.91	0.91	1.00	-	1
1754	0.83	0.73	0.88	0.73	0.88	0.99	0.05	5
1756	0.94	0.91	0.95	0.91	0.95	1.01	0.02	3
1759	0.87	.	.	0.87	0.87	1.00	-	1
1761	0.90	.	.	0.90	0.90	1.00	-	1
1762	0.86	0.85	0.92	0.85	0.92	1.00	0.03	5
17621	0.89	0.87	0.91	0.87	0.91	1.00	0.02	2
1766	0.78	0.78	0.80	0.78	0.80	1.00	0.01	3
1769	0.88	0.88	0.89	0.88	0.89	1.00	0.00	2
1770	0.82	.	.	0.82	0.82	1.00	-	1
1772	0.80	.	.	0.80	0.80	1.00	-	1
17734	0.89	0.74	1.32	0.74	1.32	1.05	0.22	3
1774	0.87	.	.	0.87	0.87	1.00	-	1
1779	0.88	0.85	0.89	0.77	1.19	1.01	0.06	21
1780	0.73	.	.	0.73	0.73	1.00	-	1
1782	1.09	0.85	1.30	0.85	1.30	1.06	0.18	4
1783	0.86	0.84	0.88	0.75	1.26	0.99	0.08	80
17831	0.85	0.83	0.86	0.74	1.33	1.01	0.08	84
1787	0.87	0.84	0.97	0.80	1.05	1.01	0.06	12
1789	0.86	.	.	0.86	0.86	1.00	-	1
1790	0.81	0.79	0.84	0.79	0.84	1.00	0.02	3
1792	0.90	.	.	0.90	0.90	1.00	-	1
1793	0.86	0.85	0.88	0.70	1.44	1.01	0.08	128
17931	0.96	0.94	0.99	0.94	0.99	1.00	0.02	2
17932	0.90	0.77	1.02	0.77	1.02	1.01	0.07	6

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
17933	0.93	0.88	0.97	0.82	0.97	1.00	0.04	12
17934	0.94	0.84	1.33	0.59	1.38	1.05	0.20	10
1795	0.87	0.84	0.92	0.75	0.99	1.01	0.06	17
1796	0.85	0.81	0.88	0.68	1.04	1.01	0.08	49
1797	0.79	0.79	0.84	0.79	0.84	1.00	0.02	3
1799	0.87	0.85	0.90	0.71	1.19	1.00	0.07	51
21001	0.85	0.75	0.95	0.75	0.95	1.00	0.07	6
21002	0.98	0.77	1.02	0.77	1.02	1.01	0.08	7
21004	0.87	0.86	0.91	0.78	1.00	1.00	0.05	9
21005	0.74	0.63	0.86	0.63	0.86	1.01	0.16	2
2101	0.86	0.80	1.04	0.80	1.04	1.00	0.06	8
21011	0.90	0.83	1.03	0.83	1.03	1.01	0.06	4
21013	1.07	.	.	1.07	1.07	1.00	-	1
21014	0.85	0.80	0.90	0.80	0.90	1.00	0.06	2
21015	0.94	0.79	1.01	0.79	1.01	1.01	0.05	8
2102	1.00	0.86	1.17	0.86	1.17	1.01	0.07	7
21021	0.91	0.84	1.02	0.84	1.02	1.00	0.06	7
21022	0.84	0.80	0.91	0.74	1.11	1.01	0.08	24
21023	1.00	0.86	1.01	0.86	1.01	1.01	0.05	3
2103	0.85	0.76	1.01	0.76	1.01	1.01	0.10	8
21031	0.82	0.78	0.85	0.78	0.85	1.00	0.04	2
2104	0.93	0.85	1.09	0.85	1.09	1.01	0.09	7
21041	0.84	.	.	0.84	0.84	1.00	-	1
2105	0.85	0.79	0.86	0.79	0.86	1.00	0.03	3
2106	0.82	0.77	0.90	0.77	0.90	1.00	0.06	6
2107	0.86	0.80	0.96	0.69	0.99	1.01	0.08	12
2108	0.81	0.73	0.87	0.73	0.87	1.00	0.06	6
2115	0.90	0.85	0.93	0.83	0.99	1.00	0.04	12
2118	0.89	.	.	0.89	0.89	1.00	-	1
2121	0.80	0.57	1.29	0.57	1.29	1.11	0.22	5
2178	0.88	0.81	0.92	0.81	0.92	1.00	0.04	5
21802	0.86	0.86	0.87	0.86	0.87	1.00	0.00	3
21804	1.02	0.98	1.06	0.98	1.06	1.00	0.04	2
21805	0.91	0.87	0.94	0.81	0.99	1.00	0.05	12
2182	0.90	0.80	0.95	0.80	0.95	1.00	0.04	7
2183	0.84	0.61	0.84	0.61	0.84	1.05	0.09	3
2184	0.84	0.73	0.92	0.70	0.97	1.02	0.08	10
2185	0.88	.	.	0.88	0.88	1.00	-	1
2186	0.85	0.84	0.90	0.79	0.99	1.00	0.05	23
2188	0.88	0.86	0.92	0.78	0.96	1.00	0.05	21
2189	0.90	0.89	0.93	0.51	1.39	1.02	0.08	50
2190	0.89	.	.	0.89	0.89	1.00	-	1
2191	0.84	.	.	0.84	0.84	1.00	-	1
2200	0.86	0.84	0.89	0.54	1.24	1.02	0.10	25
22001	0.85	0.76	0.92	0.75	0.93	1.01	0.08	10
22003	0.84	0.79	0.90	0.77	0.96	0.99	0.06	18
22004	0.84	0.83	0.85	0.75	1.03	1.00	0.05	102
22005	0.82	0.79	0.92	0.79	0.92	1.00	0.03	6
22006	0.77	0.74	0.85	0.57	1.41	1.01	0.15	28

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
22007	0.75	0.67	0.96	0.56	0.99	1.02	0.14	13
22008	0.87	0.77	0.90	0.59	1.02	1.04	0.10	17
2201	0.87	0.82	1.09	0.82	1.09	1.03	0.09	5
2202	0.85	0.84	0.90	0.69	0.97	1.01	0.05	23
22021	0.86	.	.	0.86	0.86	1.00	-	1
22022	0.85	0.83	0.87	0.74	0.92	1.00	0.04	19
2203	0.83	0.78	0.92	0.69	1.26	1.01	0.10	16
22031	0.87	0.81	0.92	0.79	1.14	1.01	0.08	12
22041	0.85	0.64	0.99	0.64	0.99	0.99	0.14	3
22043	0.91	.	.	0.91	0.91	1.00	-	1
22051	0.83	0.63	0.91	0.63	0.91	1.01	0.08	5
22052	0.81	0.74	0.87	0.74	0.87	1.00	0.08	2
2206	0.89	0.78	0.95	0.78	0.95	1.00	0.04	8
2208	0.94	.	.	0.94	0.94	1.00	-	1
2210	0.89	.	.	0.89	0.89	1.00	-	1
22101	0.90	0.89	0.93	0.75	0.99	1.00	0.05	42
2211	0.90	0.86	0.92	0.80	0.95	1.00	0.03	11
22121	0.87	0.83	0.90	0.51	1.13	1.03	0.10	17
2213	0.90	0.83	0.93	0.83	0.93	1.00	0.02	8
22141	0.90	0.62	1.12	0.62	1.12	1.04	0.11	6
2215	0.86	0.84	0.89	0.75	1.03	1.00	0.06	39
22152	0.88	0.84	0.93	0.66	1.03	1.00	0.06	25
22153	0.88	0.86	0.96	0.83	1.03	1.01	0.05	15
2216	0.93	0.87	0.98	0.87	0.99	1.00	0.04	10
2218	0.86	0.82	0.93	0.81	0.94	1.00	0.04	11
2219	0.76	0.76	0.96	0.76	0.96	1.02	0.09	3
22191	0.95	0.94	0.96	0.94	0.96	1.00	0.01	2
22192	0.66	.	.	0.66	0.66	1.00	-	1
2220	0.90	0.84	0.93	0.84	0.93	1.00	0.03	4
2221	0.86	0.82	1.04	0.82	1.04	1.00	0.06	7
2224	0.87	0.82	0.91	0.82	0.91	1.00	0.03	6
2226	0.82	0.79	0.89	0.79	0.89	1.00	0.04	5
2228	0.95	0.91	1.00	0.91	1.00	1.00	0.05	2
2229	0.95	0.92	0.98	0.56	1.31	1.05	0.09	12
2230	0.92	0.88	0.94	0.76	1.02	1.00	0.05	24
2231	0.86	0.81	0.88	0.77	1.09	1.01	0.05	10
2233	0.84	0.82	0.86	0.82	0.86	1.00	0.02	2
2235	0.91	0.86	0.97	0.85	0.98	1.01	0.04	10
2237	0.95	0.92	0.96	0.92	0.96	1.00	0.01	4
2238	0.90	0.89	0.92	0.73	1.01	1.00	0.05	36
2240	0.89	0.66	0.96	0.66	0.96	1.00	0.07	7
2241	0.90	0.84	0.96	0.84	0.96	1.00	0.05	3
2242	0.89	0.81	0.94	0.78	0.95	1.00	0.04	10
2243	0.87	0.74	1.00	0.74	1.00	0.94	0.14	2
2244	0.84	.	.	0.84	0.84	1.00	-	1
2245	0.86	0.83	0.89	0.80	0.94	1.00	0.03	12
2246	0.88	0.83	0.88	0.83	0.88	1.00	0.02	3
2248	0.86	0.83	0.88	0.75	0.99	1.00	0.05	42
2250	0.85	0.78	0.92	0.78	0.92	1.01	0.08	2

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
2251	0.85	.	.	0.85	0.85	1.00	-	1
2252	0.92	0.85	0.97	0.85	0.97	1.01	0.03	4
2253	0.83	0.79	0.92	0.79	0.92	1.00	0.05	4
2254	0.87	0.82	0.90	0.82	0.90	1.00	0.04	4
2255	0.86	0.77	0.91	0.77	0.91	1.01	0.06	4
2256	0.88	0.77	0.91	0.72	1.42	1.03	0.12	12
2257	0.83	0.74	0.91	0.74	0.91	1.01	0.10	2
2258	0.93	0.82	0.95	0.82	0.95	1.00	0.04	7
2260	0.91	0.89	0.92	0.89	0.92	1.00	0.01	2
2261	0.88	0.85	0.91	0.73	1.08	1.00	0.07	25
2262	0.84	0.78	0.85	0.78	0.85	1.00	0.03	4
2273	0.90	0.87	0.94	0.87	0.94	1.00	0.04	2
2274	0.83	0.82	0.83	0.82	0.83	1.00	0.00	2
2275	0.89	0.83	0.93	0.83	0.93	1.00	0.03	5
2276	0.76	.	.	0.76	0.76	1.00	-	1
2278	0.84	0.81	0.91	0.79	1.02	1.00	0.04	11
2279	0.92	0.88	1.00	0.77	1.17	1.00	0.09	33
22791	0.88	0.86	0.91	0.72	1.01	1.00	0.06	44
22792	0.86	0.81	0.89	0.76	0.92	1.00	0.04	9
2280	0.95	0.93	0.98	0.93	0.98	1.00	0.03	2
2281	0.93	.	.	0.93	0.93	1.00	-	1
2282	0.95	0.90	0.97	0.85	1.00	1.00	0.04	20
2283	0.89	0.69	1.01	0.69	1.01	1.02	0.09	6
22831	0.90	0.79	0.94	0.79	0.94	1.00	0.05	5
2284	0.84	0.80	0.88	0.80	0.88	1.00	0.05	2
2285	0.89	0.88	1.05	0.88	1.05	1.00	0.06	3
2286	0.83	0.81	0.86	0.81	0.86	1.00	0.02	3
2287	0.90	0.87	0.92	0.72	1.02	1.00	0.06	28
2288	0.90	0.89	0.90	0.89	0.90	1.00	0.01	2
2289	0.89	0.83	0.93	0.83	0.93	1.00	0.05	4
2290	0.88	0.77	0.91	0.77	0.94	1.01	0.07	9
2291	0.82	0.79	0.83	0.79	0.83	1.00	0.02	3
2293	0.80	0.74	0.94	0.74	1.02	1.00	0.10	12
2294	0.78	0.68	0.86	0.68	0.86	1.00	0.08	4
2295	0.87	0.85	0.89	0.85	0.89	1.00	0.02	3
2296	0.85	0.74	1.01	0.74	1.01	1.01	0.07	6
2297	0.87	0.83	0.91	0.83	0.91	1.00	0.05	2
22971	0.82	0.80	0.90	0.80	0.90	1.00	0.04	4
2298	0.86	0.79	0.90	0.73	0.91	1.00	0.05	10
2312	0.80	0.73	0.85	0.73	0.85	1.00	0.05	6
23171	0.87	0.86	1.48	0.86	1.48	1.07	0.24	3
2402	0.87	0.82	1.00	0.68	1.21	1.01	0.13	15
24021	0.91	0.74	1.18	0.74	1.18	1.03	0.13	5
2403	0.82	.	.	0.82	0.82	1.00	-	1
2405	0.81	0.77	0.84	0.74	0.89	1.00	0.04	15
24051	0.89	0.78	0.93	0.56	1.29	0.99	0.12	13
24059	0.89	0.83	0.98	0.78	1.00	1.01	0.06	11
24061	0.84	0.82	0.86	0.79	0.93	1.00	0.03	15
24062	0.89	0.84	1.18	0.84	1.18	1.02	0.08	5

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
24064	0.93	0.81	0.98	0.79	1.04	1.01	0.07	14
24066	0.86	0.70	0.94	0.70	0.94	1.01	0.07	7
24068	0.89	0.75	0.94	0.65	1.27	1.03	0.12	9
24069	0.84	0.78	0.88	0.64	1.20	1.01	0.10	35
2407	0.86	0.82	0.97	0.82	0.97	1.01	0.04	8
2408	0.84	0.80	0.88	0.71	1.08	1.01	0.07	20
24081	0.83	0.78	0.85	0.72	0.99	1.00	0.06	31
24082	0.83	0.82	0.86	0.62	1.05	1.00	0.06	43
24083	0.84	0.81	0.88	0.73	0.89	1.00	0.05	12
24085	0.89	0.85	0.92	0.85	0.92	1.00	0.04	2
24086	0.87	0.83	0.91	0.83	0.91	1.00	0.05	2
2409	0.84	0.78	0.91	0.68	0.96	1.00	0.07	13
2410	0.72	0.67	0.78	0.67	0.78	1.00	0.07	2
2411	0.88	0.86	0.92	0.53	1.16	1.01	0.10	68
24111	0.91	0.88	0.98	0.86	1.00	1.00	0.04	10
2412	0.77	0.74	0.77	0.74	0.77	1.00	0.02	3
2413	0.86	0.81	0.91	0.78	0.93	1.01	0.05	12
24131	0.91	0.87	0.93	0.76	1.36	1.00	0.08	64
24133	0.82	0.76	0.89	0.73	0.90	1.00	0.05	9
24134	0.91	0.79	1.38	0.79	1.38	0.99	0.14	7
24141	0.84	0.73	0.92	0.73	0.92	1.01	0.07	3
2415	0.84	0.82	0.88	0.74	0.95	1.00	0.04	17
24151	0.91	0.84	0.95	0.83	1.28	1.01	0.09	9
2416	0.91	0.89	0.95	0.74	1.34	1.01	0.08	79
24161	0.66	.	.	0.66	0.66	1.00	-	1
24162	0.87	0.76	0.97	0.76	0.97	1.00	0.06	4
24164	0.74	.	.	0.74	0.74	1.00	-	1
2418	0.81	0.79	0.87	0.71	0.99	1.00	0.06	19
24191	0.87	.	.	0.87	0.87	1.00	-	1
2420	0.84	0.80	0.87	0.80	0.87	1.00	0.04	2
24201	0.87	0.84	0.96	0.84	0.96	1.00	0.05	6
2421	0.83	0.65	0.93	0.65	0.93	0.98	0.10	7
2422	0.83	0.76	0.90	0.65	1.15	1.01	0.11	18
2423	0.82	0.74	0.87	0.52	0.92	1.00	0.10	12
2424	0.92	0.82	0.96	0.75	1.02	1.00	0.07	15
2426	0.67	0.65	0.98	0.65	1.33	1.06	0.17	10
24261	0.86	0.82	1.01	0.82	1.01	1.00	0.07	3
2427	0.77	.	.	0.77	0.77	1.00	-	1
24271	0.82	0.75	0.89	0.75	0.89	0.99	0.09	2
24272	0.91	0.76	1.02	0.65	1.06	1.00	0.11	11
2428	0.92	0.80	1.13	0.80	1.13	1.00	0.10	5
2429	0.92	0.82	0.96	0.66	1.06	0.99	0.09	16
24291	0.83	0.70	0.96	0.70	0.96	1.01	0.16	2
24292	0.90	0.84	0.97	0.84	1.01	1.01	0.06	9
24293	0.85	0.73	0.91	0.73	0.91	1.01	0.08	4
24294	0.90	0.84	0.95	0.78	1.01	1.00	0.05	13
24295	0.84	.	.	0.84	0.84	1.00	-	1
2430	0.89	0.69	1.04	0.69	1.04	1.02	0.09	8
2431	0.84	0.80	0.91	0.64	1.08	1.01	0.10	31

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
2432	0.81	0.74	0.82	0.61	0.96	1.00	0.06	13
24321	0.82	.	.	0.82	0.82	1.00	-	1
24322	0.84	0.81	0.91	0.73	1.03	1.00	0.06	14
24323	0.90	0.86	0.93	0.77	0.97	1.00	0.04	15
24324	0.81	.	.	0.81	0.81	1.00	-	1
2433	0.83	0.73	1.00	0.73	1.00	1.02	0.10	4
2434	0.77	0.73	0.84	0.73	0.84	1.00	0.04	4
2435	0.88	0.81	1.01	0.81	1.01	1.00	0.06	6
2436	0.89	0.84	0.95	0.63	1.05	1.01	0.08	30
2437	0.91	.	.	0.91	0.91	1.00	-	1
2439	0.80	0.78	0.88	0.74	0.89	1.00	0.05	10
2440	0.86	0.84	0.88	0.82	0.88	1.00	0.02	13
2441	0.84	0.82	0.85	0.72	0.96	1.00	0.05	45
24412	0.90	0.90	0.93	0.90	0.93	1.00	0.01	3
2442	0.77	0.75	0.88	0.75	0.88	1.00	0.05	3
2444	0.89	0.78	0.91	0.78	0.91	1.00	0.04	5
2445	0.85	.	.	0.85	0.85	1.00	-	1
2455	0.86	0.80	0.99	0.80	0.99	1.01	0.05	5
2456	0.90	0.87	0.93	0.87	0.93	1.00	0.03	2
2457	0.81	.	.	0.81	0.81	1.00	-	1
2458	0.78	0.61	0.94	0.61	0.94	1.04	0.21	2
2459	0.93	0.90	0.96	0.90	0.96	1.00	0.02	4
2472	0.92	0.87	1.17	0.87	1.17	1.01	0.07	6
2478	0.90	0.87	0.99	0.87	0.99	1.00	0.04	5
24781	0.88	0.80	0.96	0.77	1.15	1.01	0.09	13
2479	0.79	0.70	1.01	0.70	1.01	1.01	0.10	5
2480	0.85	0.79	0.90	0.70	0.97	1.00	0.07	17
24801	0.85	0.78	0.95	0.75	1.15	1.01	0.11	12
24811	0.89	0.86	0.94	0.86	0.94	1.00	0.03	6
2482	0.91	0.89	0.97	0.89	0.97	1.00	0.03	3
2483	0.58	.	.	0.58	0.58	1.00	-	1
26171	0.88	0.81	0.94	0.73	1.06	1.00	0.08	9
26172	0.86	0.83	0.90	0.83	0.90	1.01	0.04	2
4601	0.84	0.81	0.88	0.59	1.46	1.03	0.16	70
4602	0.94	.	.	0.94	0.94	1.00	-	1
4603	0.78	0.73	0.95	0.71	0.96	1.01	0.09	9
4604	0.87	0.77	1.16	0.77	1.16	1.01	0.11	6
4605	0.80	0.76	0.92	0.59	1.12	1.05	0.14	25
46051	0.87	0.77	0.99	0.77	0.99	0.99	0.06	6
4606	0.84	0.78	0.94	0.77	0.96	1.00	0.06	9
4607	0.93	0.87	1.00	0.66	1.20	1.06	0.10	13
46072	1.20	.	.	1.20	1.20	1.00	-	1
4608	0.87	0.77	0.96	0.77	0.96	1.00	0.11	2
4609	0.80	0.73	1.40	0.73	1.40	1.08	0.22	4
4610	0.84	0.67	1.01	0.67	1.01	0.95	0.20	2
4611	0.86	0.79	0.92	0.64	1.41	1.02	0.11	22
4612	0.88	0.81	0.93	0.71	0.98	1.00	0.06	10
46125	0.90	0.84	0.94	0.79	1.19	1.01	0.07	16
4613	0.85	0.81	0.90	0.62	1.27	1.02	0.13	56

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
4615	0.87	0.85	0.89	0.85	0.89	1.00	0.02	3
46151	0.86	0.76	0.96	0.76	0.96	1.01	0.11	2
4616	0.87	0.82	1.11	0.73	1.48	1.03	0.14	9
4617	0.80	0.78	0.83	0.78	0.83	0.99	0.03	2
4618	0.92	0.74	1.06	0.58	1.39	1.03	0.15	11
4619	0.90	0.85	0.95	0.67	1.03	1.01	0.07	12
4620	0.84	0.77	0.97	0.54	1.31	1.04	0.18	22
4622	0.83	0.75	1.01	0.75	1.01	1.00	0.08	7
46221	0.86	0.75	0.94	0.75	0.94	1.00	0.08	6
4623	0.82	0.72	0.94	0.72	0.94	1.01	0.06	5
4624	0.93	0.81	1.01	0.70	1.18	0.98	0.10	14
4625	0.88	0.85	0.95	0.85	0.95	1.00	0.04	3
4626	0.81	0.77	0.84	0.77	0.84	1.00	0.03	3
4627	0.87	0.81	0.90	0.80	1.09	1.00	0.06	9
4628	1.11	0.95	1.26	0.95	1.26	1.02	0.14	2
4632	0.95	0.94	0.98	0.76	1.48	1.02	0.09	55
4633	0.86	0.84	0.87	0.74	1.01	1.00	0.05	53
4643	0.87	0.80	0.91	0.79	0.94	1.01	0.05	10
4644	0.86	0.85	0.87	0.84	0.93	1.00	0.02	15
4646	0.95	0.90	0.96	0.81	1.08	1.01	0.05	13
4647	0.90	0.87	0.93	0.75	1.01	1.01	0.06	27
4648	0.82	0.80	0.83	0.65	1.14	1.00	0.05	71
4678	1.04	.	.	1.04	1.04	1.00	-	1
4679	0.93	.	.	0.93	0.93	1.00	-	1
4680	0.88	0.86	0.89	0.86	0.89	1.00	0.01	3
4682	0.83	0.79	0.88	0.79	0.95	1.00	0.05	16
4683	0.86	0.80	0.94	0.75	1.13	1.01	0.09	12
4684	0.86	0.83	0.88	0.76	1.44	1.02	0.11	35
46841	0.90	0.86	0.96	0.52	1.48	1.03	0.13	73
46842	0.86	0.83	0.89	0.69	0.98	1.01	0.06	27
4685	0.92	0.89	0.98	0.77	1.43	1.02	0.10	12
4978	0.86	0.82	0.89	0.73	0.99	1.01	0.06	32
7700	0.87	.	.	0.87	0.87	1.00	-	1
7701	0.86	0.84	0.86	0.84	0.86	1.00	0.01	3
77011	0.86	0.85	0.87	0.85	0.87	1.00	0.01	3
7702	0.89	0.88	0.93	0.84	1.46	0.99	0.09	19
7703	0.97	.	.	0.97	0.97	1.00	-	1
7704	0.89	0.75	0.93	0.75	0.93	1.01	0.04	7
7705	0.93	0.80	1.16	0.80	1.16	1.02	0.08	5
7706	0.90	0.90	0.90	0.90	0.90	1.00	0.00	2
7708	0.88	0.87	0.89	0.71	1.36	1.02	0.07	43
7709	0.88	0.86	0.91	0.86	0.91	1.00	0.01	4
7710	0.88	0.83	0.91	0.83	0.91	1.00	0.03	3
7711	0.85	0.85	0.85	0.85	0.85	1.00	0.00	2
7712	0.87	0.79	0.94	0.73	1.13	0.98	0.08	10
77122	0.87	0.86	0.92	0.86	0.92	1.00	0.02	3
77124	1.07	1.03	1.16	1.03	1.16	1.01	0.04	4
7713	0.87	0.86	0.91	0.86	0.91	1.00	0.02	3
7714	0.83	0.76	1.29	0.76	1.29	1.03	0.16	6

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
77161	0.82	0.75	0.86	0.62	1.35	0.99	0.11	28
77164	0.86	.	.	0.86	0.86	1.00	-	1
7727	0.89	0.87	0.92	0.78	1.34	1.01	0.08	61
7733	0.92	0.85	1.04	0.85	1.04	1.01	0.06	6
77332	0.95	.	.	0.95	0.95	1.00	-	1
7734	0.90	0.87	0.92	0.87	0.92	1.01	0.02	3
7737	0.90	0.86	0.92	0.86	0.92	1.00	0.02	6
7744	0.88	0.86	0.94	0.86	0.94	1.00	0.03	8
7778	0.89	.	.	0.89	0.89	1.00	-	1
7780	0.88	0.86	0.90	0.86	0.90	1.00	0.02	2
7785	0.96	0.83	0.97	0.83	0.97	1.00	0.05	3
7786	1.01	0.99	1.12	0.99	1.12	1.01	0.04	3
7790	0.96	.	.	0.96	0.96	1.00	-	1
7791	0.87	0.76	0.92	0.76	0.92	1.00	0.04	8
7792	0.91	0.90	0.94	0.78	1.50	1.02	0.11	54
77921	0.74	0.68	0.81	0.68	0.81	1.01	0.09	2
7794	0.86	0.86	0.91	0.86	0.91	1.00	0.02	3
7796	0.88	0.81	0.97	0.81	0.97	1.00	0.07	6
7812	0.88	0.84	0.96	0.84	0.96	0.99	0.05	3
9600	0.80	0.61	0.93	0.61	0.93	1.01	0.10	6
9601	0.80	0.78	0.84	0.69	1.18	1.01	0.09	38
9602	0.87	0.84	0.93	0.77	1.31	1.02	0.08	20
9603	0.93	0.80	1.18	0.80	1.18	1.11	0.16	4
9604	0.86	0.82	0.88	0.82	0.88	0.99	0.02	4
9605	0.81	0.75	0.97	0.74	1.00	1.00	0.08	11
9606	0.93	0.81	1.07	0.71	1.34	1.07	0.16	12
9607	0.82	0.79	0.88	0.74	1.10	1.01	0.07	21
9608	0.83	0.76	0.86	0.65	1.47	1.02	0.12	34
96081	0.76	0.67	0.85	0.66	0.87	1.01	0.10	22
9609	0.87	0.81	0.95	0.64	1.22	1.01	0.11	28
9610	0.90	0.84	0.93	0.68	1.35	1.03	0.11	35
96101	0.86	0.82	0.89	0.72	0.96	1.00	0.05	20
96102	0.88	0.87	0.89	0.87	0.89	1.00	0.01	2
9611	0.89	0.85	0.96	0.65	1.49	1.01	0.13	25
9613	0.84	.	.	0.84	0.84	1.00	-	1
9614	0.84	0.77	0.99	0.77	0.99	1.01	0.06	6
9615	0.83	0.62	0.87	0.62	0.87	1.03	0.10	3
9616	0.72	0.68	0.78	0.51	1.47	1.03	0.16	71
9618	0.91	0.83	0.98	0.83	0.98	1.00	0.05	3
9619	0.83	0.74	1.01	0.67	1.36	1.00	0.18	16
9620	0.88	0.84	0.89	0.59	1.50	1.02	0.10	36
9621	0.83	0.80	0.87	0.52	1.49	1.03	0.15	95
9622	0.85	0.74	0.87	0.74	0.87	1.00	0.03	8
9624	0.79	0.74	0.82	0.74	0.82	1.00	0.03	5
9625	0.87	0.82	0.90	0.77	0.98	1.00	0.05	24
96261	0.85	0.82	0.90	0.76	1.00	1.00	0.05	18
9627	0.83	0.82	0.86	0.76	0.90	1.00	0.04	35
9628	0.87	0.85	0.88	0.51	1.10	1.01	0.06	117
9629	0.73	0.65	0.80	0.65	0.80	1.03	0.10	2

Nbhd	Median	CI Low	CI Hi	Minimum	Maximum	PRD	COD	Count
9630	0.81	0.80	0.84	0.72	0.89	1.00	0.04	41
9631	0.93	0.91	0.94	0.91	0.94	1.00	0.02	2
9632	0.84	.	.	0.84	0.84	1.00	-	1
9633	0.85	0.81	0.89	0.75	1.03	1.00	0.05	16
9634	0.89	0.86	0.92	0.51	0.98	1.04	0.09	37
9635	0.93	0.76	1.00	0.76	1.00	1.00	0.07	5
9636	0.90	0.86	0.93	0.79	0.97	1.00	0.04	18
9637	0.81	0.80	0.84	0.54	1.13	1.02	0.11	61
9638	0.96	0.92	1.01	0.83	1.08	1.00	0.05	22
9639	0.90	0.87	0.94	0.75	1.04	1.00	0.07	54
96411	0.89	0.85	0.91	0.81	0.96	1.00	0.04	17
9653	0.81	0.79	0.81	0.76	0.92	1.00	0.04	25
9678	0.82	0.82	0.88	0.82	0.88	1.00	0.03	3
9679	0.92	0.88	0.97	0.88	0.97	1.00	0.03	4
99176	0.79	.	.	0.79	0.79	1.00	-	1
99213	0.86	0.78	0.93	0.71	1.06	1.01	0.08	10
T1265	0.86	0.82	0.89	0.82	0.89	1.00	0.03	8
T2002	0.82	.	.	0.82	0.82	1.00	-	1
T2109	0.78	0.68	0.87	0.68	0.87	1.01	0.08	4
T2111	0.86	0.80	0.88	0.72	0.93	1.00	0.05	22
T2113	0.86	.	.	0.86	0.86	1.00	-	1
T212	0.87	0.80	0.93	0.80	0.93	1.00	0.04	4
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,235

Appendix A-2--Ratio Statistics by Neighborhood, Sorted by Median Assessment Ratio

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
2426	0.67	0.65	0.98	0.65	1.33	1.06	0.17	10
9616	0.72	0.68	0.78	0.51	1.47	1.03	0.16	71
0800	0.73	0.69	0.76	0.52	0.99	1.02	0.13	49
22007	0.75	0.67	0.96	0.56	0.99	1.02	0.14	13
96081	0.76	0.67	0.85	0.66	0.87	1.01	0.10	22
22006	0.77	0.74	0.85	0.57	1.41	1.01	0.15	28
1700	0.78	0.71	0.82	0.66	1.02	1.00	0.08	21
0650	0.79	0.68	0.85	0.67	0.89	1.00	0.07	10
1234	0.79	0.73	0.89	0.66	1.00	1.01	0.09	24
1735	0.79	0.66	0.81	0.65	0.86	1.00	0.05	10
1319	0.79	0.76	0.95	0.64	1.30	1.01	0.14	21
14064	0.79	0.75	1.06	0.69	1.08	1.02	0.13	10
4605	0.80	0.76	0.92	0.59	1.12	1.05	0.14	25
11011	0.80	0.71	0.88	0.71	0.90	1.00	0.06	10
14061	0.80	0.77	0.91	0.71	1.16	1.02	0.11	24
1227	0.80	0.75	0.92	0.66	1.13	1.00	0.11	22
2439	0.80	0.78	0.88	0.74	0.89	1.00	0.05	10
1230	0.80	0.76	0.86	0.68	1.01	1.00	0.07	19
9601	0.80	0.78	0.84	0.69	1.18	1.01	0.09	38
1129	0.80	0.79	0.84	0.77	0.93	1.00	0.04	12
2293	0.80	0.74	0.94	0.74	1.02	1.00	0.10	12
1226	0.81	0.75	0.93	0.66	0.95	1.00	0.10	11
2432	0.81	0.74	0.82	0.61	0.96	1.00	0.06	13
1251	0.81	0.73	0.87	0.73	0.93	1.01	0.07	10
9605	0.81	0.75	0.97	0.74	1.00	1.00	0.08	11
1442	0.81	0.78	0.89	0.55	1.25	1.03	0.13	33
9653	0.81	0.79	0.81	0.76	0.92	1.00	0.04	25
1415	0.81	0.72	0.91	0.54	1.26	1.02	0.16	23
2418	0.81	0.79	0.87	0.71	0.99	1.00	0.06	19
9630	0.81	0.80	0.84	0.72	0.89	1.00	0.04	41
1239	0.81	0.76	1.32	0.73	1.48	1.05	0.20	11
1252	0.81	0.77	0.84	0.65	0.95	1.00	0.07	35
9637	0.81	0.80	0.84	0.54	1.13	1.02	0.11	61
1254	0.81	0.78	0.92	0.71	1.15	1.01	0.09	16
12461	0.81	0.77	0.89	0.73	0.99	1.01	0.06	13
1179	0.81	0.76	0.88	0.76	0.94	1.00	0.06	14
2405	0.81	0.77	0.84	0.74	0.89	1.00	0.04	15
2423	0.82	0.74	0.87	0.52	0.92	1.00	0.10	12
1718	0.82	0.79	0.89	0.68	0.92	0.99	0.06	14
1132	0.82	0.79	0.84	0.72	0.89	1.00	0.04	15
1303	0.82	0.77	0.87	0.70	1.44	1.02	0.13	28
1228	0.82	0.78	0.90	0.66	1.01	1.00	0.07	13
4648	0.82	0.80	0.83	0.65	1.14	1.00	0.05	71

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
1123	0.82	0.78	0.91	0.69	1.01	1.01	0.08	24
1218	0.82	0.80	0.85	0.71	0.91	1.00	0.04	20
1222	0.82	0.76	0.87	0.66	1.06	1.00	0.08	24
1384	0.82	0.80	0.84	0.72	1.32	1.03	0.12	49
11332	0.82	0.78	0.85	0.74	0.94	1.00	0.04	16
77161	0.82	0.75	0.86	0.62	1.35	0.99	0.11	28
1383	0.82	0.78	0.86	0.75	0.89	1.00	0.04	13
9607	0.82	0.79	0.88	0.74	1.10	1.01	0.07	21
1238	0.83	0.80	0.90	0.66	0.98	1.01	0.07	17
1126	0.83	0.80	0.88	0.74	0.91	1.00	0.05	16
1119	0.83	0.77	0.93	0.74	0.94	1.00	0.08	15
9619	0.83	0.74	1.01	0.67	1.36	1.00	0.18	16
0604	0.83	0.80	0.89	0.76	1.07	1.00	0.07	33
9608	0.83	0.76	0.86	0.65	1.47	1.02	0.12	34
1744	0.83	0.78	0.86	0.66	1.43	1.02	0.13	31
0700	0.83	0.78	0.87	0.54	1.41	1.01	0.15	72
4682	0.83	0.79	0.88	0.79	0.95	1.00	0.05	16
14421	0.83	0.77	0.95	0.75	1.07	1.02	0.09	12
24081	0.83	0.78	0.85	0.72	0.99	1.00	0.06	31
11972	0.83	0.66	0.89	0.52	1.27	1.05	0.16	19
0701	0.83	0.80	0.86	0.71	1.00	1.00	0.07	20
1255	0.83	0.73	1.39	0.68	1.42	1.08	0.23	11
9627	0.83	0.82	0.86	0.76	0.90	1.00	0.04	35
2422	0.83	0.76	0.90	0.65	1.15	1.01	0.11	18
1443	0.83	0.79	0.91	0.53	1.33	1.04	0.16	28
9621	0.83	0.80	0.87	0.52	1.49	1.03	0.15	95
2203	0.83	0.78	0.92	0.69	1.26	1.01	0.10	16
24082	0.83	0.82	0.86	0.62	1.05	1.00	0.06	43
0704	0.83	0.80	0.85	0.66	1.05	1.00	0.07	37
1318	0.83	0.73	1.06	0.70	1.17	1.02	0.13	11
1131	0.83	0.80	0.86	0.78	0.89	1.00	0.03	17
0703	0.83	0.82	0.86	0.72	1.38	1.02	0.12	71
2184	0.84	0.73	0.92	0.70	0.97	1.02	0.08	10
12561	0.84	0.76	0.88	0.67	1.03	1.01	0.07	10
4601	0.84	0.81	0.88	0.59	1.46	1.03	0.16	70
14276	0.84	0.80	0.90	0.77	1.04	1.01	0.08	15
12222	0.84	0.78	0.92	0.71	0.99	1.00	0.07	13
24083	0.84	0.81	0.88	0.73	0.89	1.00	0.05	12
1381	0.84	0.82	0.86	0.74	0.94	1.00	0.04	39
12411	0.84	0.77	0.90	0.74	1.04	1.01	0.09	17
1739	0.84	0.80	0.87	0.62	1.46	1.05	0.12	33
24322	0.84	0.81	0.91	0.73	1.03	1.00	0.06	14
1219	0.84	0.81	0.88	0.68	1.07	1.00	0.07	26
24061	0.84	0.82	0.86	0.79	0.93	1.00	0.03	15
14063	0.84	0.77	1.02	0.76	1.20	1.02	0.12	13
1181	0.84	0.80	0.88	0.76	0.90	1.00	0.04	15

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
2409	0.84	0.78	0.91	0.68	0.96	1.00	0.07	13
4620	0.84	0.77	0.97	0.54	1.31	1.04	0.18	22
24069	0.84	0.78	0.88	0.64	1.20	1.01	0.10	35
2441	0.84	0.82	0.85	0.72	0.96	1.00	0.05	45
1328	0.84	0.74	0.89	0.72	0.98	1.01	0.07	11
2408	0.84	0.80	0.88	0.71	1.08	1.01	0.07	20
2415	0.84	0.82	0.88	0.74	0.95	1.00	0.04	17
21022	0.84	0.80	0.91	0.74	1.11	1.01	0.08	24
2431	0.84	0.80	0.91	0.64	1.08	1.01	0.10	31
0605	0.84	0.76	0.90	0.72	1.00	1.01	0.08	18
1300	0.84	0.80	0.88	0.74	1.01	1.00	0.06	25
2278	0.84	0.81	0.91	0.79	1.02	1.00	0.04	11
22003	0.84	0.79	0.90	0.77	0.96	0.99	0.06	18
1451	0.84	0.78	0.92	0.57	1.44	1.03	0.18	23
22004	0.84	0.83	0.85	0.75	1.03	1.00	0.05	102
1198	0.85	0.82	0.88	0.81	0.90	1.00	0.02	10
1262	0.85	0.74	0.96	0.73	0.99	1.02	0.08	11
1796	0.85	0.81	0.88	0.68	1.04	1.01	0.08	49
24801	0.85	0.78	0.95	0.75	1.15	1.01	0.11	12
1386	0.85	0.84	0.85	0.75	0.96	1.00	0.03	90
11191	0.85	0.82	0.87	0.77	1.01	1.00	0.04	14
0710	0.85	0.82	0.87	0.51	1.43	1.03	0.10	96
17831	0.85	0.83	0.86	0.74	1.33	1.01	0.08	84
1721	0.85	0.83	0.89	0.74	0.97	1.00	0.05	17
22022	0.85	0.83	0.87	0.74	0.92	1.00	0.04	19
4613	0.85	0.81	0.90	0.62	1.27	1.02	0.13	56
1207	0.85	0.82	0.88	0.79	1.31	1.02	0.07	15
1261	0.85	0.82	0.88	0.69	1.08	1.01	0.08	45
9633	0.85	0.81	0.89	0.75	1.03	1.00	0.05	16
17183	0.85	0.80	0.95	0.62	1.02	1.05	0.08	11
96261	0.85	0.82	0.90	0.76	1.00	1.00	0.05	18
1250	0.85	0.82	0.89	0.74	1.11	1.00	0.06	26
2202	0.85	0.84	0.90	0.69	0.97	1.01	0.05	23
1712	0.85	0.79	0.90	0.73	1.00	1.00	0.07	24
17121	0.85	0.84	0.87	0.80	0.99	1.00	0.03	13
2480	0.85	0.79	0.90	0.70	0.97	1.00	0.07	17
17113	0.85	0.80	0.91	0.71	1.03	1.00	0.08	12
2186	0.85	0.84	0.90	0.79	0.99	1.00	0.05	23
1418	0.85	0.68	1.01	0.67	1.06	1.00	0.13	10
22001	0.85	0.76	0.92	0.75	0.93	1.01	0.08	10
1140	0.85	0.82	0.87	0.73	0.94	1.01	0.05	17
1134	0.85	0.80	0.88	0.63	0.91	1.00	0.06	12
1242	0.86	0.79	0.90	0.60	0.94	1.00	0.08	12
2440	0.86	0.84	0.88	0.82	0.88	1.00	0.02	13
1307	0.86	0.78	0.90	0.70	1.12	1.01	0.08	18
1404	0.86	0.82	0.90	0.51	1.48	1.04	0.17	111

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
1441	0.86	0.81	0.90	0.70	1.39	1.03	0.13	29
1783	0.86	0.84	0.88	0.75	1.26	0.99	0.08	80
1730	0.86	0.80	0.92	0.76	1.03	1.00	0.07	12
4633	0.86	0.84	0.87	0.74	1.01	1.00	0.05	53
1736	0.86	0.69	0.92	0.58	1.06	1.00	0.13	16
2248	0.86	0.83	0.88	0.75	0.99	1.00	0.05	42
4978	0.86	0.82	0.89	0.73	0.99	1.01	0.06	32
2218	0.86	0.82	0.93	0.81	0.94	1.00	0.04	11
4684	0.86	0.83	0.88	0.76	1.44	1.02	0.11	35
2245	0.86	0.83	0.89	0.80	0.94	1.00	0.03	12
4644	0.86	0.85	0.87	0.84	0.93	1.00	0.02	15
4683	0.86	0.80	0.94	0.75	1.13	1.01	0.09	12
2231	0.86	0.81	0.88	0.77	1.09	1.01	0.05	10
1237	0.86	0.82	0.90	0.73	1.02	1.01	0.07	24
2413	0.86	0.81	0.91	0.78	0.93	1.01	0.05	12
1793	0.86	0.85	0.88	0.70	1.44	1.01	0.08	128
1106	0.86	0.82	0.88	0.82	0.89	0.99	0.02	10
4611	0.86	0.79	0.92	0.64	1.41	1.02	0.11	22
2298	0.86	0.79	0.90	0.73	0.91	1.00	0.05	10
46842	0.86	0.83	0.89	0.69	0.98	1.01	0.06	27
T2111	0.86	0.80	0.88	0.72	0.93	1.00	0.05	22
2215	0.86	0.84	0.89	0.75	1.03	1.00	0.06	39
2200	0.86	0.84	0.89	0.54	1.24	1.02	0.10	25
1469	0.86	0.84	0.89	0.63	1.03	1.00	0.07	64
12323	0.86	0.83	0.93	0.75	0.98	1.00	0.05	12
99213	0.86	0.78	0.93	0.71	1.06	1.01	0.08	10
2107	0.86	0.80	0.96	0.69	0.99	1.01	0.08	12
1711	0.86	0.82	0.93	0.73	1.00	1.02	0.07	26
96101	0.86	0.82	0.89	0.72	0.96	1.00	0.05	20
9625	0.87	0.82	0.90	0.77	0.98	1.00	0.05	24
1710	0.87	0.84	0.95	0.72	1.16	1.00	0.09	17
1787	0.87	0.84	0.97	0.80	1.05	1.01	0.06	12
12002	0.87	0.82	0.92	0.76	1.18	1.02	0.09	18
14941	0.87	0.85	0.88	0.72	1.30	1.01	0.08	50
9628	0.87	0.85	0.88	0.51	1.10	1.01	0.06	117
2402	0.87	0.82	1.00	0.68	1.21	1.01	0.13	15
22121	0.87	0.83	0.90	0.51	1.13	1.03	0.10	17
0602	0.87	0.77	0.98	0.72	1.06	1.01	0.10	10
1708	0.87	0.81	0.92	0.74	1.43	1.01	0.10	31
7712	0.87	0.79	0.94	0.73	1.13	0.98	0.08	10
1321	0.87	0.79	0.93	0.59	1.09	1.00	0.13	37
22031	0.87	0.81	0.92	0.79	1.14	1.01	0.08	12
4643	0.87	0.80	0.91	0.79	0.94	1.01	0.05	10
1799	0.87	0.85	0.90	0.71	1.19	1.00	0.07	51
17147	0.87	0.84	0.89	0.70	1.03	0.99	0.05	32
22008	0.87	0.77	0.90	0.59	1.02	1.04	0.10	17

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
9602	0.87	0.84	0.93	0.77	1.31	1.02	0.08	20
17441	0.87	0.84	0.94	0.83	1.38	1.02	0.09	12
14581	0.87	0.71	0.92	0.53	1.07	1.04	0.11	10
1456	0.87	0.82	0.93	0.57	1.43	1.02	0.18	47
1701	0.87	0.82	0.93	0.56	1.32	1.03	0.13	23
1702	0.87	0.82	0.90	0.60	1.15	1.01	0.10	32
1795	0.87	0.84	0.92	0.75	0.99	1.01	0.06	17
9609	0.87	0.81	0.95	0.64	1.22	1.01	0.11	28
14042	0.87	0.84	0.92	0.59	1.49	1.04	0.15	87
0609	0.87	0.82	0.90	0.74	1.04	1.00	0.06	15
12322	0.87	0.83	0.94	0.77	1.15	1.00	0.08	29
0702	0.88	0.84	0.91	0.55	1.46	1.01	0.11	63
1294	0.88	0.86	0.93	0.83	0.95	1.00	0.04	13
1439	0.88	0.85	0.92	0.81	1.41	1.04	0.13	19
1779	0.88	0.85	0.89	0.77	1.19	1.01	0.06	21
17142	0.88	0.85	0.88	0.56	1.41	1.00	0.08	72
1103	0.88	0.80	0.94	0.77	0.95	1.00	0.05	12
14362	0.88	0.64	0.95	0.51	1.15	1.01	0.13	13
0679	0.88	0.82	0.93	0.80	1.09	1.00	0.05	11
7708	0.88	0.87	0.89	0.71	1.36	1.02	0.07	43
1429	0.88	0.76	0.96	0.65	1.48	1.04	0.14	12
2261	0.88	0.85	0.91	0.73	1.08	1.00	0.07	25
2256	0.88	0.77	0.91	0.72	1.42	1.03	0.12	12
14062	0.88	0.76	0.90	0.70	1.24	1.03	0.10	10
22153	0.88	0.86	0.96	0.83	1.03	1.01	0.05	15
11261	0.88	0.76	0.98	0.70	1.12	1.02	0.09	11
2188	0.88	0.86	0.92	0.78	0.96	1.00	0.05	21
1325	0.88	0.82	0.93	0.57	1.27	1.00	0.11	37
1713	0.88	0.86	0.89	0.67	1.26	1.00	0.06	47
14561	0.88	0.85	1.00	0.81	1.05	1.01	0.06	14
9620	0.88	0.84	0.89	0.59	1.50	1.02	0.10	36
1406	0.88	0.79	0.92	0.74	1.10	1.01	0.08	25
22791	0.88	0.86	0.91	0.72	1.01	1.00	0.06	44
1723	0.88	0.80	0.91	0.74	1.03	1.00	0.06	16
1487	0.88	0.79	0.94	0.70	1.27	1.02	0.13	15
2411	0.88	0.86	0.92	0.53	1.16	1.01	0.10	68
22152	0.88	0.84	0.93	0.66	1.03	1.00	0.06	25
24781	0.88	0.80	0.96	0.77	1.15	1.01	0.09	13
14275	0.88	0.81	0.99	0.61	1.38	1.05	0.17	26
4612	0.88	0.81	0.93	0.71	0.98	1.00	0.06	10
1470	0.88	0.82	0.96	0.56	1.42	1.03	0.11	13
11232	0.89	0.86	0.91	0.84	0.98	1.00	0.04	18
11101	0.89	0.85	0.95	0.76	0.98	1.00	0.06	12
2436	0.89	0.84	0.95	0.63	1.05	1.01	0.08	30
14065	0.89	0.84	1.07	0.69	1.35	1.03	0.13	13
17165	0.89	0.87	0.90	0.81	0.90	1.00	0.02	14

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
12382	0.89	0.86	0.91	0.79	0.98	1.01	0.04	21
9611	0.89	0.85	0.96	0.65	1.49	1.01	0.13	25
7727	0.89	0.87	0.92	0.78	1.34	1.01	0.08	61
1116	0.89	0.82	0.91	0.81	0.93	1.00	0.03	10
14251	0.89	0.86	0.95	0.73	1.05	1.01	0.07	20
9634	0.89	0.86	0.92	0.51	0.98	1.04	0.09	37
14681	0.89	0.85	0.92	0.71	1.50	1.02	0.10	39
96411	0.89	0.85	0.91	0.81	0.96	1.00	0.04	17
14691	0.89	0.86	0.92	0.82	1.01	1.00	0.05	20
12662	0.89	0.85	0.91	0.78	1.16	1.01	0.06	25
14284	0.89	0.82	0.93	0.51	1.43	1.01	0.12	29
1444	0.89	0.87	0.92	0.56	1.48	1.02	0.12	65
1466	0.89	0.83	0.95	0.65	1.38	1.00	0.12	21
1400	0.89	0.87	0.92	0.71	1.36	1.03	0.09	14
1428	0.89	0.82	0.91	0.62	1.46	1.03	0.13	50
0978	0.89	0.84	0.94	0.75	1.24	1.01	0.09	36
1709	0.89	0.85	0.91	0.68	1.25	1.01	0.09	60
1133	0.89	0.86	0.91	0.80	1.11	1.00	0.05	41
7702	0.89	0.88	0.93	0.84	1.46	0.99	0.09	19
14283	0.89	0.86	0.91	0.57	1.49	1.02	0.14	55
1465	0.89	0.82	0.94	0.58	1.21	1.02	0.09	19
14091	0.89	0.85	0.99	0.79	1.08	1.01	0.06	10
1454	0.89	0.80	0.94	0.80	0.98	1.01	0.06	11
1716	0.89	0.87	0.90	0.74	1.43	1.02	0.07	56
24051	0.89	0.78	0.93	0.56	1.29	0.99	0.12	13
0711	0.89	0.84	0.91	0.67	1.16	1.01	0.08	41
1130	0.89	0.85	0.95	0.81	1.08	1.01	0.06	12
1111	0.89	0.87	0.92	0.68	1.36	1.01	0.08	105
17133	0.89	0.87	0.91	0.86	1.04	0.99	0.03	11
24059	0.89	0.83	0.98	0.78	1.00	1.01	0.06	11
1124	0.89	0.86	0.94	0.73	0.95	1.00	0.05	15
1446	0.89	0.84	0.98	0.67	1.48	1.04	0.16	26
1431	0.89	0.87	0.91	0.60	1.34	1.00	0.09	63
2242	0.89	0.81	0.94	0.78	0.95	1.00	0.04	10
1256	0.90	0.87	0.94	0.57	1.14	1.01	0.09	40
1424	0.90	0.88	0.93	0.66	1.47	1.01	0.11	58
46125	0.90	0.84	0.94	0.79	1.19	1.01	0.07	16
1495	0.90	0.88	0.95	0.85	1.32	1.01	0.07	11
1724	0.90	0.84	0.97	0.78	1.13	1.02	0.08	19
9639	0.90	0.87	0.94	0.75	1.04	1.00	0.07	54
1206	0.90	0.85	0.93	0.80	0.97	1.00	0.05	25
1425	0.90	0.89	0.91	0.69	1.39	1.01	0.07	122
24323	0.90	0.86	0.93	0.77	0.97	1.00	0.04	15
46841	0.90	0.86	0.96	0.52	1.48	1.03	0.13	73
1105	0.90	0.86	0.92	0.77	0.98	1.00	0.04	11
1460	0.90	0.86	0.91	0.81	1.32	1.01	0.07	20

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
1403	0.90	0.88	0.93	0.63	1.46	1.03	0.11	24
1482	0.90	0.88	0.98	0.78	1.28	1.01	0.07	11
1409	0.90	0.87	0.93	0.74	1.08	0.99	0.06	32
14811	0.90	0.82	0.94	0.51	1.23	1.01	0.12	18
2115	0.90	0.85	0.93	0.83	0.99	1.00	0.04	12
1477	0.90	0.86	0.92	0.74	1.44	1.00	0.10	38
14474	0.90	0.83	0.94	0.76	1.38	1.01	0.11	22
1725	0.90	0.88	0.93	0.81	1.06	1.01	0.05	23
2287	0.90	0.87	0.92	0.72	1.02	1.00	0.06	28
1728	0.90	0.85	0.95	0.77	1.37	1.01	0.11	26
0613	0.90	0.88	0.91	0.84	1.08	1.00	0.03	13
1215	0.90	0.88	0.94	0.82	1.15	1.01	0.05	32
9610	0.90	0.84	0.93	0.68	1.35	1.03	0.11	35
4647	0.90	0.87	0.93	0.75	1.01	1.01	0.06	27
9636	0.90	0.86	0.93	0.79	0.97	1.00	0.04	18
14351	0.90	0.83	0.94	0.81	0.94	1.02	0.04	10
1447	0.90	0.89	0.91	0.55	1.49	1.03	0.14	170
1494	0.90	0.86	0.93	0.68	1.42	1.01	0.09	32
14274	0.90	0.85	0.95	0.80	1.09	0.99	0.06	16
4619	0.90	0.85	0.95	0.67	1.03	1.01	0.07	12
2211	0.90	0.86	0.92	0.80	0.95	1.00	0.03	11
1422	0.90	0.87	0.95	0.58	1.04	1.00	0.06	21
22101	0.90	0.89	0.93	0.75	0.99	1.00	0.05	42
1453	0.90	0.88	0.92	0.68	1.44	1.00	0.08	92
1459	0.90	0.85	0.93	0.72	1.45	1.01	0.08	41
1115	0.90	0.89	0.92	0.81	0.99	1.00	0.04	30
1450	0.90	0.88	0.92	0.75	1.42	1.02	0.09	55
2189	0.90	0.89	0.93	0.51	1.39	1.02	0.08	50
14121	0.90	0.81	1.04	0.69	1.19	1.02	0.14	19
24294	0.90	0.84	0.95	0.78	1.01	1.00	0.05	13
2238	0.90	0.89	0.92	0.73	1.01	1.00	0.05	36
1478	0.90	0.89	0.93	0.64	1.42	1.01	0.09	74
1405	0.90	0.85	0.93	0.54	1.49	1.04	0.16	58
1427	0.91	0.86	0.94	0.75	1.38	1.04	0.12	37
1421	0.91	0.87	0.94	0.63	1.45	1.02	0.13	54
1411	0.91	0.87	0.95	0.59	1.48	1.02	0.13	26
1468	0.91	0.84	0.93	0.79	1.46	1.02	0.12	16
14281	0.91	0.89	0.97	0.61	1.18	1.01	0.09	32
17137	0.91	0.90	0.92	0.68	1.05	1.00	0.04	17
1410	0.91	0.89	0.93	0.54	1.49	1.03	0.13	130
1246	0.91	0.85	0.97	0.76	1.14	1.01	0.09	24
2235	0.91	0.86	0.97	0.85	0.98	1.01	0.04	10
2416	0.91	0.89	0.95	0.74	1.34	1.01	0.08	79
1434	0.91	0.85	0.94	0.69	1.06	1.01	0.07	19
1485	0.91	0.86	0.96	0.73	1.42	1.03	0.13	21
24272	0.91	0.76	1.02	0.65	1.06	1.00	0.11	11

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
1412	0.91	0.88	0.93	0.74	1.41	1.01	0.10	61
21805	0.91	0.87	0.94	0.81	0.99	1.00	0.05	12
14311	0.91	0.85	0.95	0.68	1.49	1.00	0.09	26
1101	0.91	0.88	0.94	0.77	1.10	1.01	0.07	28
14771	0.91	0.86	0.95	0.74	1.47	1.01	0.13	39
7792	0.91	0.90	0.94	0.78	1.50	1.02	0.11	54
24131	0.91	0.87	0.93	0.76	1.36	1.00	0.08	64
14475	0.91	0.90	0.94	0.72	1.43	1.03	0.13	47
0606	0.91	0.82	0.98	0.59	1.38	1.06	0.13	20
1407	0.91	0.89	0.94	0.87	1.35	1.00	0.06	14
24111	0.91	0.88	0.98	0.86	1.00	1.00	0.04	10
1445	0.91	0.86	0.94	0.67	1.48	1.03	0.12	36
2279	0.92	0.88	1.00	0.77	1.17	1.00	0.09	33
14261	0.92	0.90	0.93	0.62	1.42	1.01	0.08	168
1440	0.92	0.88	0.96	0.61	1.44	1.04	0.15	64
1467	0.92	0.90	0.94	0.55	1.49	1.01	0.09	84
11971	0.92	0.89	0.94	0.87	0.98	1.00	0.03	10
4618	0.92	0.74	1.06	0.58	1.39	1.03	0.15	11
4685	0.92	0.89	0.98	0.77	1.43	1.02	0.10	12
14172	0.92	0.85	1.01	0.74	1.37	1.02	0.15	23
2230	0.92	0.88	0.94	0.76	1.02	1.00	0.05	24
2429	0.92	0.82	0.96	0.66	1.06	0.99	0.09	16
1414	0.92	0.89	0.94	0.58	1.38	1.01	0.10	54
14801	0.92	0.91	0.95	0.58	1.40	1.02	0.11	63
14161	0.92	0.91	0.95	0.70	1.50	1.00	0.09	50
14551	0.92	0.88	0.95	0.76	1.29	1.02	0.08	29
1455	0.92	0.89	0.96	0.73	1.29	1.01	0.09	42
2424	0.92	0.82	0.96	0.75	1.02	1.00	0.07	15
4607	0.93	0.87	1.00	0.66	1.20	1.06	0.10	13
1476	0.93	0.90	0.94	0.54	1.47	1.02	0.14	97
1402	0.93	0.71	1.28	0.64	1.30	1.04	0.13	11
24064	0.93	0.81	0.98	0.79	1.04	1.01	0.07	14
1480	0.93	0.88	0.96	0.54	1.30	1.01	0.11	36
1720	0.93	0.91	0.99	0.81	1.21	1.01	0.08	29
2216	0.93	0.87	0.98	0.87	0.99	1.00	0.04	10
1423	0.93	0.90	0.94	0.60	1.45	1.02	0.11	65
9606	0.93	0.81	1.07	0.71	1.34	1.07	0.16	12
1244	0.93	0.88	1.06	0.70	1.09	1.01	0.08	10
14163	0.93	0.90	0.99	0.71	1.23	1.01	0.09	21
11231	0.93	0.91	0.95	0.78	1.06	1.00	0.04	47
17933	0.93	0.88	0.97	0.82	0.97	1.00	0.04	12
1461	0.93	0.90	0.99	0.80	1.50	1.03	0.12	17
1457	0.93	0.80	1.05	0.64	1.30	1.02	0.13	12
14471	0.93	0.84	1.17	0.83	1.47	1.03	0.13	14
1496	0.93	0.91	0.98	0.80	1.30	1.01	0.10	21
4624	0.93	0.81	1.01	0.70	1.18	0.98	0.10	14

Nbhd	Median	CI Lo	CI Hi	Minimum	Maximum	PRD	COD	Count
14501	0.94	0.90	0.96	0.65	1.49	1.02	0.11	85
1416	0.94	0.91	0.96	0.86	1.40	1.00	0.08	24
11233	0.94	0.93	0.96	0.84	1.10	1.00	0.04	26
1401	0.94	0.89	1.09	0.87	1.44	1.02	0.10	24
14692	0.94	0.90	1.15	0.81	1.49	1.01	0.14	12
1438	0.94	0.88	0.96	0.82	1.38	1.01	0.09	17
11351	0.94	0.87	1.00	0.74	1.14	1.00	0.08	20
17934	0.94	0.84	1.33	0.59	1.38	1.05	0.20	10
1143	0.94	0.90	0.95	0.70	1.14	1.01	0.07	17
1479	0.94	0.91	0.99	0.76	1.41	1.02	0.11	33
2229	0.95	0.92	0.98	0.56	1.31	1.05	0.09	12
2282	0.95	0.90	0.97	0.85	1.00	1.00	0.04	20
1432	0.95	0.88	1.01	0.84	1.14	1.00	0.08	12
14282	0.95	0.90	1.00	0.71	1.34	1.01	0.09	20
4646	0.95	0.90	0.96	0.81	1.08	1.01	0.05	13
4632	0.95	0.94	0.98	0.76	1.48	1.02	0.09	55
1297	0.96	0.93	0.99	0.81	1.22	1.00	0.05	41
9638	0.96	0.92	1.01	0.83	1.08	1.00	0.05	22
1225	0.96	0.90	1.01	0.85	1.06	1.00	0.06	12
1738	1.01	0.90	1.12	0.79	1.45	1.04	0.15	32
1741	1.03	0.80	1.38	0.72	1.47	1.05	0.21	11
Overall	0.88	0.88	0.88	0.51	1.50	1.01	0.10	13,235

Appendix A-3 – Report of MRA Modeling Results for District 14

- We used 2003-2005 sales to develop a simple additive multiple regression model and tested it, as much as possible, using 2006 sales. We deleted some properties with missing or atypical data, NBHDs with less than 15 usable sales (36% of all sales), and seven ratio outliers, leaving 1,187 validated and verified sales from 38 NBHDs to develop the model. The indicated inflation rate was 0.3% per month, and we adjusted the 2003-2005 sales at this rate to January 1, 2006. As shown below, the R-Square was .893. The square foot rates have the expected progression and the coefficients are largely intuitive. The median ratio is 1.01 and the COD is 11.2.

  While we had a good number of 2006 sales (mostly from the first quarter), virtually none had been verified or validated. As a first attempt to remove invalid sales, we deleted those that differed from the mean time-adjusted sale price for the NBHD by more than 50% (18.9% fell outside this range). Next we eliminated the 15% worst ratios (those farthest from the median). The remaining 557 sales produced a median ratio of .984 and COD of 22.9. A comparable analysis of the current values against 2006 sales (again deleting sales prices that differed from the average for the NBHD by more than 50% and deleting the worst 15% of ratios) produced a median of .825 and COD of 24.1. See final tables below.

While this is the hardest of the four regions to model and, while it is difficult to evaluate the results using the 2006 sales, it demonstrates that MRA produce values centered on market and that good model results and uniformity can be obtained if the data are good. The models that follow for the other residential regions in the next three appendices employed a similar methodology and produced superior results.

Model: 25

R Square	Adjusted R Square	Std. Error of the Estimate
.898	.893	26455.60964

Model: 25

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	84469.096	3710.074		22.767	.000
SFLA_D	3.791	4.492	.010	.844	.399
SFLA_C_MIN	12.622	2.670	.070	4.727	.000
SFLA_C	23.307	2.535	.168	9.195	.000
SFLA_C_PLS	36.581	2.526	.333	14.482	.000
SFLA_B_MIN	41.057	3.290	.169	12.480	.000
SFLA_B	49.958	2.942	.303	16.983	.000
SFLA_B_PLS	67.437	2.946	.420	22.894	.000
SFLA_A	69.721	3.761	.243	18.538	.000
SFLA_A_PLS_X	83.402	3.128	.485	26.667	.000
CDU_FAIR_SF	-5.974	4.705	-.013	-1.270	.204
CDU_GOOD_SF	7.055	1.659	.065	4.252	.000
CDU_VG_EXC_SF	15.158	1.824	.161	8.309	.000
ACRES.75	16742.478	6262.013	.027	2.674	.008
NB_1403	55895.996	7001.262	.080	7.984	.000
NB_1404	33139.607	5094.496	.066	6.505	.000
NB_14042	47462.231	7155.439	.068	6.633	.000
NB_1409	-14757.550	6979.486	-.021	-2.114	.035
NB_1410	11836.860	4442.266	.028	2.665	.008
NB_1412	20339.252	5988.683	.034	3.396	.001
NB_1414	37139.276	6927.961	.053	5.361	.000
NB_14161	15084.339	5259.693	.029	2.868	.004
NB_1423	31409.961	6333.155	.049	4.960	.000
NB_1424	45032.417	5600.288	.081	8.041	.000
NB_1425	82227.366	4466.933	.192	18.408	.000
NB_14261	82581.113	3646.265	.267	22.648	.000
NB_1427	57695.686	5946.834	.098	9.702	.000
NB_14275	52277.475	6192.869	.085	8.442	.000
NB_1331	64002.520	6524.589	.099	9.809	.000
NB_1445	7908.040	5286.798	.015	1.496	.135
NB_14475	-9149.612	5739.233	-.016	-1.594	.111
NB_1450	12632.068	4748.149	.027	2.660	.008
NB_14501	16943.744	3914.175	.046	4.329	.000
NB_1453	-10011.658	4052.162	-.028	-2.471	.014
NB_1455	38868.015	5306.428	.075	7.325	.000
NB_14551	30285.467	6373.402	.048	4.752	.000
NB_1456	23992.800	6944.217	.034	3.455	.001
NB_1467	28469.137	5602.639	.051	5.081	.000
NB_1476	11455.987	4177.466	.029	2.742	.006
NB_1477	17082.051	6779.199	.025	2.520	.012
NB_1480	24220.724	6135.609	.039	3.948	.000
NB_14801	8034.653	5518.682	.015	1.456	.146
NB_1494	-12695.753	6517.369	-.019	-1.948	.052
NB_14941	8983.273	5135.748	.018	1.749	.081

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
ONE_BEDROOM	-10423.305	6753.042	-.015	-1.543	.123
FIXTURES_7	2093.777	403.912	.073	5.184	.000
NO_BSMT	-11966.648	3798.430	-.035	-3.150	.002
CRAWL	-3946.787	1930.373	-.024	-2.045	.041
NoCentralHeatSF	-17.469	3.554	-.054	-4.915	.000
NoACSF	-8.653	1.723	-.053	-5.023	.000
BsmtGar	9959.104	2017.437	.054	4.937	.000
RecArea	7.618	5.374	.014	1.417	.157
OpFrPorch	19.071	7.581	.027	2.516	.012
OpMasPorch	36.571	13.130	.029	2.785	.005
EnPorch	58.001	13.719	.042	4.228	.000
GarageSF	28.054	6.636	.046	4.228	.000
Carport	17.096	7.767	.025	2.201	.028
WoodDeck	17.497	9.384	.020	1.864	.063

Excluded Variables

Model: 25

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics: Tolerance
RANCH	.006	.512	.609	.015	.670
COLONIAL	.002	.234	.815	.007	.842
UnfinBsmt	-.002	-.149	.882	-.004	.879
AGE40SF	-.001	-.068	.946	-.002	.431
FinAttic	.000	-.033	.974	-.001	.851
SPLIT	.001	.060	.952	.002	.883
NB_1469	-.001	-.086	.931	-.003	.783
NB_1459	-.001	-.117	.907	-.003	.830
NB_1444	-.007	-.629	.529	-.019	.825
MasUtilityBldg	.005	.448	.654	.013	.843
TWO_BEDROOMS	-.011	-.992	.321	-.030	.766
NB_14681	-.011	-1.069	.285	-.032	.912
GreenHouse	.006	.642	.521	.019	.940
FrUtilityBldg	-.009	-.838	.402	-.025	.810
DUPLEX	-.009	-.897	.370	-.027	.880
NB_1478	.007	.674	.500	.020	.809
MODERN	-.011	-1.151	.250	-.034	.926
NB_1421	.011	1.131	.258	.034	.914
NB_14283	.012	1.213	.225	.036	.924
BILEVEL	-.013	-1.284	.199	-.038	.919

Ratio Statistics for MRA Values / TASP

Sales	1187
Median	1.012
Weighted Mean	1.003
Minimum	.579
Maximum	1.532
Price Related Differential	1.021
Coefficient of Dispersion	.112

Results for 2006 Sales

Ratio Statistics for MRA Value / SPRICE

Group	Sales	Median	Mean	Weighted Mean	Minimum	Maximum	PRD	COD
Overall	557	.984	.995	.955	.511	1.543	1.042	.229

Ratio Statistics for Current 2006 Values / SPRICE

Group	Sales	Median	Mean	Weighted Mean	Minimum	Maximum	PRD	COD
Overall	557	.825	.833	.808	.387	1.331	1.031	.241

Appendix A-4 – Report of MRA Modeling Results for District 17

This is the highest value of the four regions with an average time-adjusted sale price of $525,000. The file contained a good number of grade "E" (excellent) and "X" (deluxe) homes. The data also contained certain peculiarities, suggesting that the data may have been messaged somewhat to fit the sales. Over 98% of the sales (and almost 90% of the unsold properties) had CDU's of "GD" (good) or better and we eventually had to omit CDU variables as they would have entered the model perversely, with values declining as CDU's increased. Age variables were also insignificant, suggesting either that older homes are in better areas and/or that depreciation is not being effectively captured.

Still, the model was able to explain over 91% of the variation in sales prices and generated a median sales ratio of 1.010 and a COD of 10.6 for the sold properties. Comparable statistics for 143 holdout 2006 sales were 1.057 and 10.6 (same as for the properties used to develop the model), versus 0.842 and 11.3 for the current 2007 values. The time adjustment factor was 0.54% per month.

The model and ratio study statistics follow.

Model: 14

R				
MODEL = 1.00 (Selected)	MODEL ~= 1.00 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate
.960	.834	.922	.918	82556.62957

Model: 14

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	189253.500	15109.298		12.526	.000
SFLA_C	13.133	7.753	.021	1.694	.091
SFLA_C_PLS	14.905	5.601	.044	2.661	.008
SFLA_B_MIN	21.854	4.891	.083	4.468	.000
SFLA_B	37.205	5.253	.115	7.083	.000
SFLA_B_PLS	56.246	4.375	.276	12.856	.000
SFLA_A_MIN	59.368	5.987	.117	9.916	.000
SFLA_A	63.551	5.743	.149	11.066	.000
SFLA_A_PLS	74.732	4.374	.288	17.085	.000
SFLA_E_MIN	155.892	6.358	.284	24.520	.000
SFLA_E	167.112	5.521	.371	30.268	.000
SFLA_X_MIN	105.256	6.738	.190	15.620	.000
SFLA_X	113.618	5.612	.292	20.246	.000
SFLA_X_PLS	166.375	5.682	.381	29.281	.000
ACRES.25	219644.691	40732.641	.054	5.392	.000

NB_1708	110346.923	16785.145	.068	6.574	.000
NB_1709	185644.886	13508.550	.154	13.743	.000
NB_1710	172206.869	23725.768	.071	7.258	.000
NB_1712	207764.699	18550.517	.114	11.200	.000
NB_1713	228154.529	19724.139	.122	11.567	.000
NB_17137	217016.729	22146.094	.097	9.799	.000
NB_17142	104785.960	12815.622	.086	8.176	.000
NB_17147	203772.284	18260.976	.112	11.159	.000
NB_1716	173499.979	15692.707	.121	11.056	.000
NB_1720	64203.432	20999.329	.031	3.057	.002
NB_1721	258501.413	22639.374	.115	11.418	.000
NB_1735	-89877.599	23145.464	-.040	-3.883	.000
NB_1736	-136762.835	24062.976	-.059	-5.684	.000
NB_1738	-103437.723	22065.681	-.049	-4.688	.000
NB_1744	-130622.085	24412.614	-.054	-5.351	.000
NB_1779	38920.917	20791.911	.020	1.872	.062
NB_1795	37411.377	22164.087	.017	1.688	.092
NB_1799	69143.754	14134.266	.052	4.892	.000
NB_7702	98303.421	28262.826	.039	3.478	.001
NB_7708	98574.208	16448.231	.063	5.993	.000
NB_7792	64371.461	16722.878	.047	3.849	.000
SplitSF	-11.789	5.574	-.021	-2.115	.035
NO_BSMT	-20440.173	15287.343	-.014	-1.337	.182
Fixtures	7239.716	1212.677	.112	5.970	.000
NoACSF	-5.872	5.814	-.010	-1.010	.313
LT_3_BEDROOMS	-14110.614	11275.870	-.014	-1.251	.211
BsmtGar	8449.090	6152.707	.015	1.373	.170
Garage	71.909	13.154	.095	5.467	.000
RecArea	22.862	10.029	.023	2.280	.023
Carport	30.374	21.301	.019	1.426	.154

Excluded Variables

Model: 14

	Beta In	t	Sig.	Partial Corre-lation	Collinearity Statistics Tolerance
NB_1793	-.002	-.202	.840	-.007	.624
NB_1783	.001	.100	.920	.003	.730
WoodDeck	-.002	-.234	.815	-.008	.868
ALUM_SIDING	-.003	-.302	.762	-.010	.872
UtilBldg	.005	.531	.596	.018	.866
AGE5	-.009	-.467	.641	-.016	.249
NB_7727	-.013	-1.078	.281	-.037	.606
UnfinBsmt	.009	.786	.432	.027	.774
NB_1796	.016	1.356	.175	.047	.691

Ratio Statistics for MRA Value / TASP

Sales	893
Median	1.010
Weighted Mean	1.000
Minimum	.640
Maximum	1.569
Price Related Differential	1.017
Coefficient of Dispersion	.106

Results for 2006 Sales

MRA Value / SPRICE

Sales	143
Median	1.057
Weighted Mean	1.026
Minimum	.774
Maximum	1.324
Range	.550
Price Related Differential	1.014
Coefficient of Dispersion	.106

Current 2006 Values / SPRICE

Sales	143
Median	.842
Weighted Mean	.832
Minimum	.598
Maximum	1.059
Range	.461
Price Related Differential	1.015
Coefficient of Dispersion	.113

Appendix A-5– Report of MRA Modeling Results for North Fulton

The MRA model for North Fulton produced excellent results. This is the second most expensive of the four regions with a time-adjusted sale price of slightly over $400,000. The final model, shown below, is based on 2,000 sales from January 2003 through December 2005. The time adjustment factor was 0.4% per month. Square foot rates show good progression from lower to higher grades. The model achieved an adjusted R-square of 96% and produced a median ratio of 1.004 and a COD of 6.9. When applied to a holdout group of 323 electronically edited sales from early 2006, the median ratio was 0.98 and the COD was 7.4, compared with a median ratio of 0.858 and COD of 8.8 for the current 2006 values.

Model Summary

Model: 44

R				
MODEL = 1.00 (Selected)	MODEL ~= 1.00 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate
.982	.943	.964	.962	43034.57490

Coefficients

Model: 44

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	165304.859	5164.988		32.005	.000
SFLA_C_PLS	16.262	2.228	.043	7.299	.000
SFLA_B_MIN	24.940	2.032	.080	12.275	.000
SFLA_B	31.150	1.661	.148	18.756	.000
SFLA_B_PLS	38.956	1.914	.144	20.355	.000
SFLA_A	44.406	1.500	.271	29.607	.000
SFLA_A_PLS	58.031	1.579	.383	36.760	.000
SFLA_X_MIN	67.313	1.639	.394	41.076	.000
SFLA_X	81.898	1.774	.390	46.170	.000
SFLA_X_PLS	111.115	1.806	.385	61.538	.000
AGE20SF	.312	.083	.029	3.755	.000
SQRT_ACRES	59867.067	9968.804	.027	6.005	.000
WATER	90130.166	13982.770	.034	6.446	.000
NB_0604	135278.862	11514.566	.061	11.748	.000
NB_1111	54369.836	8167.575	.050	6.657	.000
NB_1115	16118.724	8533.288	.009	1.889	.059
NB_1124	-23132.715	11375.091	-.009	-2.034	.042
NB_1131	21603.987	11575.885	.008	1.866	.062
NB_11351	44421.909	10516.747	.020	4.224	.000
NB_1143	53127.310	9284.244	.027	5.722	.000
NB_1181	20108.872	11410.639	.008	1.762	.078
NB_1206	33650.835	9596.465	.017	3.507	.000
NB_1215	28480.657	9076.932	.015	3.138	.002

NB_1222	58490.702	10253.195	.026	5.705	.000
NB_1234	78863.757	9695.009	.038	8.134	.000
NB_1237	136895.554	12313.479	.058	11.118	.000
NB_1238	94463.894	11783.412	.038	8.017	.000
NB_12382	108474.086	11229.908	.049	9.659	.000
NB_1252	27930.001	8235.393	.016	3.391	.001
NB_1254	26704.248	11372.018	.011	2.348	.019
NB_1256	54012.882	9881.783	.025	5.466	.000
NB_12662	142113.682	8129.212	.088	17.482	.000
NB_1297	87409.107	9075.545	.053	9.631	.000
NB_21022	27848.604	11493.461	.013	2.423	.015
NB_2110	37246.470	18252.293	.009	2.041	.041
NB_2186	97090.402	10926.537	.046	8.886	.000
NB_2188	59253.839	9932.732	.028	5.966	.000
NB_2189	132474.942	9329.506	.081	14.200	.000
NB_2200	44627.698	12649.759	.016	3.528	.000
NB_22003	105060.235	10972.878	.046	9.575	.000
NB_22007	43610.636	25431.356	.008	1.715	.087
NB_22008	37816.118	14788.702	.011	2.557	.011
NB_2202	36962.340	10597.511	.016	3.488	.000
NB_22022	21120.726	11187.546	.009	1.888	.059
NB_22101	-21632.929	7067.135	-.014	-3.061	.002
NB_2215	34775.330	7523.444	.026	4.622	.000
NB_22152	60568.033	10371.745	.029	5.840	.000
NB_2230	130835.092	11305.392	.059	11.573	.000
NB_2238	28863.676	9242.637	.016	3.123	.002
NB_22451	155393.775	11388.865	.066	13.644	.000
NB_2248	171685.610	10135.660	.107	16.939	.000
NB_2261	163601.892	11469.651	.077	14.264	.000
NB_2263	33401.191	11651.284	.013	2.867	.004
NB_2279	103058.287	9436.347	.058	10.921	.000
NB_22791	169931.846	9549.731	.120	17.794	.000
NB_2282	54869.665	10436.911	.025	5.257	.000
NB_2405	59044.577	12111.275	.022	4.875	.000
NB_24069	29879.238	9295.803	.015	3.214	.001
NB_2408	41536.534	10798.820	.018	3.846	.000
NB_24081	102799.787	11420.719	.045	9.001	.000
NB_24082	38792.258	8271.644	.023	4.690	.000
NB_2411	36296.075	7843.545	.023	4.628	.000
NB_2436	61632.230	9965.683	.032	6.184	.000
NB_96411	64028.694	15244.185	.019	4.200	.000
CAPE	26407.887	12372.808	.010	2.134	.033
FIXTURES_13	3546.584	473.582	.068	7.489	.000
NO_BSMT	-22073.099	3130.785	-.047	-7.050	.000
CRAWL	-16765.138	5963.771	-.013	-2.811	.005
BsmtGar	4763.804	3114.914	.008	1.529	.126
UnfinBsmt	24.805	3.378	.039	7.343	.000
Open_Porch	68.648	8.104	.045	8.471	.000
EnPorch	121.671	22.064	.026	5.515	.000
FrameGarage	63.455	8.232	.072	7.709	.000
MasGarage	86.941	8.283	.119	10.496	.000

WoodDeck	11.945	6.788	.010	1.760	.079
UtilBldg	44.106	23.301	.009	1.893	.059
OBY_Value	1.090	.352	.015	3.101	.002
BELOW_STREET	-8528.245	4128.067	-.009	-2.066	.039

Excluded Variables

Model: 44

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
NB_1133	-.001	-.259	.796	-.006	.841
NB_2287	.003	.646	.518	.015	.925
NB_11232	.001	.207	.836	.005	.926
NB_1126	-.003	-.600	.548	-.014	.951
LT_3_BEDROOMS	-.001	-.155	.877	-.004	.854
NB_1219	.000	-.016	.987	.000	.924
NB_12322	.004	.934	.351	.021	.936
PARTIAL_BSMT	-.003	-.522	.602	-.012	.780
BILEVEL	-.001	-.252	.801	-.006	.837
NB_1123	.003	.692	.489	.016	.928
NB_T2111	.002	.489	.625	.011	.834
COLONIAL	-.005	-1.052	.293	-.024	.763
NB_1261	.000	-.052	.959	-.001	.762
RANCH	.000	.050	.960	.001	.738
NB_1218	.003	.691	.490	.016	.858
CDU_FAIR_SF	.001	.227	.820	.005	.747
NB_1132	.004	.875	.382	.020	.925
GreenHouse	.004	.791	.429	.018	.906
NB_2441	.000	-.105	.917	-.002	.952
NB_1140	-.003	-.576	.565	-.013	.896
Carport	.005	.871	.384	.020	.585
SFLA_C	.010	1.108	.268	.025	.225
NB_1227	.001	.118	.906	.003	.860
NB_24131	-.003	-.615	.539	-.014	.816
MODERN	-.004	-.891	.373	-.020	.840
NB_12411	.006	1.356	.175	.031	.874
RecArea	.005	1.129	.259	.026	.867
NB_1101	-.005	-.978	.328	-.022	.879
NB_1230	-.004	-.971	.332	-.022	.891
CDU_EXC_SF	-.007	-.874	.382	-.020	.301
NB_2416	.001	.121	.904	.003	.770
NB_22004	-.004	-.722	.470	-.016	.642
NB_11233	-.003	-.624	.533	-.014	.908
CDU_VG_SF	.003	.472	.637	.011	.468
SPLIT	-.006	-1.290	.197	-.029	.807

CDU_GOOD_SF	.006	.968	.333	.022	.531
NB_11231	-.006	-1.318	.188	-.030	.788
NB_11332	-.007	-1.480	.139	-.034	.939
NB_22006	.006	1.357	.175	.031	.941
SFLA_C_MIN	-.007	-1.506	.132	-.034	.904
NB_1246	.007	1.600	.110	.036	.864

Ratio Statistics for MRA Value / TASP

Sales	2000
Median	1.004
Weighted Mean	1.000
Minimum	.684
Maximum	1.419
Price Related Differential	1.008
Coefficient of Dispersion	.069

Results for 2006 Sales

MRA Value / SPRICE

Sales	323
Median	.980
Weighted Mean	.971
Minimum	.808
Maximum	1.168
Range	.360
Price Related Differential	1.009
Coefficient of Dispersion	.074

Current 2006 Value / SPRICE

Sales	323
Median	.858
Weighted Mean	.859
Minimum	.465
Maximum	1.160
Range	.695
Price Related Differential	1.003
Coefficient of Dispersion	.088

Appendix A-6– Report of MRA Modeling Results for South Fulton

The South region also produced excellent results. This is the largest of the four regions with 3,907 sales from 2004-2006 used in the final model (see below). The time adjustment factor was 0.3% per month and the average time-adjusted sale price is near $185,000. The model produced an adjusted R-square of .954, median ratio of 1.004 and COD of 5.8. The square foot rates all show the expected progression and many variables are significant in the model with reasonable coefficients, including a waterfront adjustment of $46,088.

When applied to a holdout group of 590 electronically edited sales from early 2006 the median ratio is 0.969 and the COD is 7.1. Comparable statistics for the existing 2006 values are 0.890 and 9.3, respectively.

Model Summary

Model: 33

R				
MODEL = 1.00 (Selected)	MODEL ~= 1.00 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate
.977	.936	.955	.954	15719.12518

Coefficients

Model: 33

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	91546.507	2536.628		36.090	.000
SFLA_D	5.380	2.707	.009	1.987	.047
SFLA_C_MIN	11.982	1.454	.041	8.241	.000
SFLA_C	17.549	.933	.198	18.815	.000
SFLA_C_PLS	19.728	1.029	.297	19.172	.000
SFLA_B_MIN	28.677	1.126	.289	25.469	.000
SFLA_B	33.414	1.410	.286	23.701	.000
SFLA_B_PLS	39.748	1.465	.306	27.138	.000
SFLA_A_MIN	45.848	1.844	.211	24.862	.000
SFLA_A	51.386	1.794	.309	28.649	.000
SFLA_A_PLS	59.662	1.856	.318	32.145	.000
AGE5	-353.728	44.619	-.059	-7.928	.000
CDU_POOR_SF	-17.790	4.588	-.014	-3.878	.000
CDU_FAIR_SF	-3.616	.941	-.017	-3.841	.000
CDU_GOOD_SF	1.918	.812	.029	2.362	.018
CDU_VG_SF	2.986	.922	.038	3.237	.001
CDU_EXC_SF	9.563	1.890	.033	5.059	.000
SQRT_ACRES	34797.147	2790.445	.045	12.470	.000
WaterFront	46088.013	7252.104	.023	6.355	.000
NB_0700	9279.369	2813.081	.012	3.299	.001

NB_0701	-7737.970	4086.624	-.007	-1.893	.058
NB_0703	-12676.292	2524.105	-.020	-5.022	.000
NB_0710	53538.560	2340.205	.112	22.878	.000
NB_0711	7212.026	2954.537	.009	2.441	.015
NB_0715	28808.233	3598.279	.029	8.006	.000
NB_0716	9703.461	1872.060	.020	5.183	.000
NB_0725	22681.480	4311.519	.019	5.261	.000
NB_0978	-5991.644	3493.620	-.006	-1.715	.086
NB_1307	-8197.918	4181.651	-.007	-1.960	.050
NB_1325	11484.740	3043.380	.014	3.774	.000
NB_1334	9222.382	3900.666	.009	2.364	.018
NB_1381	36284.866	2630.148	.061	13.796	.000
NB_1386	-3945.490	1722.572	-.010	-2.290	.022
NB_4601	8325.170	2521.424	.013	3.302	.001
NB_4605	54077.257	4328.432	.044	12.493	.000
NB_4611	29567.500	3959.238	.027	7.468	.000
NB_4620	34404.974	4362.562	.031	7.886	.000
NB_4632	53589.981	5510.716	.079	9.725	.000
NB_4633	55521.788	3954.282	.103	14.041	.000
NB_4634	27637.608	6040.905	.030	4.575	.000
NB_4635	43132.456	2488.762	.071	17.331	.000
NB_4636	47336.181	4906.406	.054	9.648	.000
NB_4644	121456.016	6681.851	.135	18.177	.000
NB_4647	64421.197	3869.176	.090	16.650	.000
NB_46481	23891.897	3174.995	.027	7.525	.000
NB_46482	36809.006	4070.715	.036	9.042	.000
NB_4649	27193.721	3885.419	.027	6.999	.000
NB_4682	60865.611	4919.266	.055	12.373	.000
NB_4684	27848.976	5217.221	.031	5.338	.000
NB_46841	27687.632	3772.599	.041	7.339	.000
NB_46842	33382.379	4129.484	.033	8.084	.000
NB_4978	104337.067	5101.632	.097	20.452	.000
NB_9602	34739.399	4415.369	.029	7.868	.000
NB_9610	8176.900	3715.794	.008	2.201	.028
NB_9616	20982.750	2888.940	.027	7.263	.000
NB_9620	9490.740	3147.473	.012	3.015	.003
NB_96241	15492.968	3345.124	.017	4.632	.000
NB_9625	-10737.946	4073.822	-.009	-2.636	.008
NB_86261	76347.145	5674.193	.065	13.455	.000
NB_9628	-12142.363	2623.662	-.018	-4.628	.000
NB_9630	-3871.250	2610.172	-.005	-1.483	.138
NB_9633	15200.995	3535.076	.015	4.300	.000
NB_9634	6351.970	3528.498	.006	1.800	.072
NB_9636	20457.476	1615.934	.051	12.660	.000
NB_9637	15471.871	4437.309	.012	3.487	.000
NB_9639	23674.493	4282.171	.019	5.529	.000
NB_9643	14062.050	3416.699	.015	4.116	.000
NB_9645	-10070.693	2692.945	-.014	-3.740	.000
NB_9646	13268.417	7923.792	.006	1.675	.094
NB_9647	8363.591	3354.666	.009	2.493	.013

NB_9548	6216.855	1784.027	.013	3.485	.000
NB_9650	-8822.320	1848.559	-.018	-4.773	.000
NB_9652	-4539.844	1817.503	-.009	-2.498	.013
NB_9653	8976.720	2249.632	.015	3.990	.000
NB_9556	3668.905	1878.564	.007	1.953	.051
NB_9658	7516.676	3327.548	.008	2.259	.024
NB_9661	8233.206	2607.374	.012	3.158	.002
NB_9662	52253.541	5174.438	.052	10.098	.000
NB_9664	14113.622	2000.861	.029	7.054	.000
NB_96651	10980.274	3955.851	.010	2.776	.006
NB_9672	34242.118	4162.193	.029	8.227	.000
NB_9673	3359.205	1905.473	.007	1.763	.078
NB_9674	12052.599	2134.740	.025	5.646	.000
NB_9675	12861.507	2688.145	.019	4.785	.000
NB_9681	10444.175	2216.211	.018	4.713	.000
NB_9684	-9889.907	3973.565	-.012	-2.489	.013
NB_9855	-10534.437	3898.064	-.010	-2.702	.007
NB_9690	11170.880	3403.053	.012	3.283	.001
NB_9692	28544.879	4153.487	.024	6.873	.000
NB_9700	-5723.006	1984.519	-.011	-2.884	.004
NB_9701	43408.286	5449.055	.034	7.966	.000
NB_9703	4423.698	2423.671	.007	1.825	.068
NB_99008	-6545.701	2630.620	-.009	-2.488	.013
NO_CENTRAL_HEAT	-8133.267	3314.372	-.010	-2.454	.014
NoACSF	-5.188	1.171	-.018	-4.430	.000
Fixtures	1791.122	192.114	.064	9.323	.000
NO_BSMT	-16577.121	909.478	-.105	-18.227	.000
CRAWL	-10843.926	1530.539	-.036	-7.085	.000
PARTIAL_BSMT	-6106.485	1609.186	-.016	-3.795	.000
RecArea	19.000	3.201	.021	5.936	.000
UnfinBsmt	23.433	2.927	.035	8.006	.000
Open_Porch	26.314	3.622	.029	7.266	.000
Garage	38.929	1.930	.117	20.172	.000
Carport	25.617	4.408	.024	5.811	.000
WoodDeck	29.455	3.792	.037	7.767	.000
OBY_Value	1.259	.274	.017	4.590	.000

Excluded Variables

Model: 33

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics: Tolerance
NB_0702	-.003	-.754	.451	-.012	.689
NB_9665	-.003	-.935	.350	-.015	.889
NB_96541	-.005	-1.347	.178	-.022	.725
NB_46145	-.002	-.682	.495	-.011	.948
NB_1300	-.002	-.688	.492	-.011	.896
UtilBldg	.000	-.081	.936	-.001	.822
NB_9621	-.003	-.747	.455	-.012	.791

NB_1303	.000	-.051	.959	-.001	.789
BsmtGar	.002	.370	.711	.006	.469
NB_4613	.000	.028	.978	.000	.907
NB_46491	-.001	-.265	.791	-.004	.824
NB_9671	.000	.057	.954	.001	.907
NB_9680	.000	.055	.956	.001	.864
NB_1321	.000	.041	.968	.001	.932
SFLA_D_MIN	-.003	-.950	.342	-.015	.956
NB_9608	.001	.211	.833	.003	.872
NB_9607	.001	.343	.731	.006	.914
ASBESTOS	-.002	-.643	.520	-.010	.833
NB_1384	.001	.225	.822	.004	.837
NB_9651	.000	-.004	.997	.000	.818
NB_0704	.002	.485	.628	.008	.889
EnPorch	.002	.687	.492	.011	.906
NB_1319	.002	.635	.525	.010	.923
NB_9609	.003	.821	.412	.013	.922
NB_9601	.003	.778	.436	.013	.884
NB_9638	.003	.664	.507	.011	.791
NB_9670	.003	.934	.351	.015	.890
NB_9666	.003	.960	.337	.016	.925
NB_0800	.004	1.117	.264	.018	.938
NB_9654	.005	1.201	.230	.019	.822
NB_9627	.005	1.249	.212	.020	.839
NB_9611	-.005	-1.369	.171	-.022	.901

Ratio Statistics for MRA Value / TASP

Sales	3907
Median	1.004
Weighted Mean	1.000
Minimum	.716
Maximum	1.452
Price Related Differential	1.006
Coefficient of Dispersion	.058

Results for 2006 Sales

MRA Value / SPRICE

Sales	590
Median	.969
Weighted Mean	.962
Minimum	.767
Maximum	1.201
Range	.434
Price Related Differential	1.013
Coefficient of Dispersion	.071

Current 2006 Value / SPRICE

Sales	590
Median	.890
Weighted Mean	.878
Minimum	.589
Maximum	1.195
Range	.607
Price Related Differential	1.012
Coefficient of Dispersion	.093

Appendix A7 Acronyms and Abbreviations Used in Report

4-R Act	Railroad Revitalization and Regulatory Reform Act
AGJD	Almy, Gloudemans, Jacobs & Denne, the consulting firm that is the author of this report
ASR	Assessment-sale price ratio
BOA	Board of Assessors
BOE	Board of equalization
BOMA	Building Owners and Managers Association
CA	Chief appraiser
CALP	Computer-assisted land pricing
CAMA	Computer-assisted mass appraisal
CBD	Central business district
CBH	Cherry Bekaert Holland
C&I	Commercial and industrial
CDU	Condition, desirability and usability, a composite property characteristic used by CLT
C/I	Commercial/industrial
CI Low or CI95Lo or 95% CI Lo Bound	Lower bound of the 95 percent confidence interval about the median
CI Hi or CI95Up or 95% CI Hi Bound	Upper bound of the 95 percent confidence interval about the median
CLT	Cole Layer Trumble Company, the company that produces the county's new CAMA system, iasWorld, that furnished the earlier MAS system, and that has furnished reappraisal services.
Cnt	Count
COD	Coefficient of dispersion
Comps	Comparable properties or comparable sales
DAA	The [state] Department of Audits and Accounts
DOR	The [state] Department of Revenue
GIS	Geographic information system
HTS	Hearing tracking system
IAAO	International Association of Assessing Officers
I&E	Income and expense
IAS or "iasWorld"	Integrated Assessment System—a CLT CAMA system
IT	Information Technology
LUC	Land use code
MAS	A CLT CAMA system
Max	Maximum
M&S	Marshall and Swift, a publisher of building and construction cost data
Min	Minimum
Mos1299	Months since December 1999
MRA	Multiple regression analysis
N.M.	Not meaningful
OASIS	A CLT CAMA system
PC	Personal computer adhering to the Intel/Microsoft de facto standard

PRD	Price-related differential
PT-61	The form promulgated by the Georgia Department of Revenue that buyers and sellers must complete when they transfer real property.
QA	Quality assurance
R&D	Research and development
RCN	Replacement cost new
RCNLD	Replacement cost new less depreciation
RDBMS	Relational database management system
SAS	Statistical Analysis System, a statistical software package
SF	Single family
SPSS	Statistical Package for the Social Sciences, a statistical package available in several versions, including client-server and PC-based
USPAP	Uniform Standards of Professional Appraisal Practice
Wtd	Weighted