



Department  
of  
ASSESSMENTS  
AND  
TAXATION

2013 Ratio Report



State of Maryland

DEPARTMENT OF ASSESSMENTS AND TAXATION

Office of the Director

MARTIN O'MALLEY  
Governor

ROBERT E. YOUNG  
Director

April 11, 2014

The Honorable Martin O'Malley  
And  
The General Assembly of Maryland

As required by Section 2-202 of the Tax-Property Article of the Annotated Code of Maryland, I am pleased to submit the Department of Assessments and Taxation's 2013 Assessment Ratio Report. This report measures the quality of real property assessments in each of Maryland's 24 jurisdictions.

Uniform and accurate assessments are the foundation of fair property taxation. Maryland's Constitution requires that all real property subject to property taxation be assessed uniformly. State law requires that assessments be based on the fair market value of the property. Therefore, uniformity and market value are the standards used to measure the quality of the assessment work performed by the Department.

This report measures assessment quality by looking at the most recent reassessment program and comparing the results of the effort to actual market conditions. Because state law requires that one-third of all real property be reassessed each year, the Department's program resulted in 678,763 reassessment notices being issued in late December of 2012. These reassessments reflected our estimates of property values as of January 1, 2013. To provide an objective quality measure of that work, this report tests those reappraisal results against property sales for the 12 month period of July 1, 2012 to June 30, 2013.

The Department has adopted the national standards for measuring property assessment quality as outlined by the International Association of Assessing Officers. Those national standards, as well as our compliance with those standards, are discussed in the body of this report. Statewide, the Department has met the IAAO standard for coefficient of dispersion indicating an overall uniformity of assessments.

I hope that you find this report useful and informative. Please feel free to share with me any suggestions that you may have to improve this report or the assessment process in Maryland.

Sincerely,

Robert E. Young  
Director

# 2013 ASSESSMENT RATIO REPORT

## SECTION I – OVERVIEW

The Department of Assessments and Taxation appraises real property for the purposes of property taxation. Properties are valued using the three approaches to value generally recognized by the appraisal profession: cost, sales comparison, and (when applicable) income.

Residential property characteristics include type of structure, size, quality and type of construction, condition of structure, and any new improvements. Commercial properties are reviewed for type of structure, size, type and quality of construction, condition of structure, current use of the property, any new improvements, types of tenants, and vacancy.

This year we valued over 678,763 properties, which require the use of mass appraisal techniques. While a fee appraiser is concerned with valuing one property at a time, an assessor is valuing whole neighborhoods. To accomplish this, special mass appraisal procedures are used. The assessor will review the data and calculate replacement costs for improvements much like a fee appraiser. The assessor will then review the sales from the area. In Maryland, the local assessment office, except in Baltimore City, receives a copy of all deeds and property sales prices as the deed transferring the property is recorded with the clerk of the court. In Baltimore City, the Department of Public Works does the data entry and provides the data to the Department. In the assessor's review and analysis of the sales, the assessor will develop land rates, depreciation tables, and sales analysis reports. After completing the analysis, the assessor applies the factors uniformly throughout the neighborhood to value all comparable properties in a uniform manner. Rental rates, vacancy and collection loss, expense ratios and capitalization rates are analyzed, and uniformly applied for comparable income producing properties.

The Department's work is reviewed by legislative auditors and is often scrutinized by individual property owners. We are continually striving for higher quality in assessment uniformity. Our quality control program begins with the individual assessor and the assessor's immediate supervisor. As work is completed, each assessor's supervisor reviews the analysis, makes recommendations, and approves the work. When the assessor completes the revaluation, the supervisor makes a random check using procedural and data editing checks. Following the completion of the revaluation, various computer edits are made to assure good valuation quality.

A measurement of quality is the assessed value/sale price ratio. A ratio is the relationship of two numbers, in this case assessed value and sale price. It measures how closely our values compare to the actual sales prices. The average assessed value/sale price ratio indicates a typical level of value. Because the marketplace is not perfect, there will always be properties that sell for more or less than can be anticipated due to factors such as buyers willing to pay extra for a unique property or declining values in a buyer's market.

In mass appraisal and assessment ratio studies, we are not only concerned with average assessed value/sale price levels (ratios) but also with the degree of spread (variation) from the typical ratio. The measurement of variation is called the coefficient of dispersion (COD). The lower the COD, the more uniform the assessment level.

In the balance of this report, Section II will give a more detailed explanation of the statistical terms as applied to assessment administration and quality control. Section III explains the International Association of Assessing Officers' Standard of Performance for ratio studies. Section IV gives an overview of statewide appraisal quality for the most recent valuation of triennial Group 1, performed in December 2012.

## **SECTION II – RATIO STATISTICS**

The purpose of this ratio study is to test the quality of the assessment product. The quality of the assessment product is examined from both an assessment level and assessment uniformity standpoint. Assessment level examines the degree to which the assessments are performed based upon the statutory requirement of full market value. Assessment uniformity measures the degree to which different properties are assessed at equal percentages of their market values. From our most recent valuation, we perform many ratio studies examining neighborhoods, types of structures, age of structures, etc.

We use as a performance gauge several measures of central tendency. Each measure of central tendency is affected differently by outliers. A ratio of assessed value to sale price is calculated for each property. The average ratio is the total of all ratios divided by the number of sales. The average (mean) ratio has a natural upward bias. This would indicate a higher level of assessment than has actually occurred. The median is the midpoint of any data listed from lowest to highest. The median ratio is the point where half the ratios fall above and half ratios fall below. The median ratio counts each ratio equally. It is less biased by extreme ratios (outliers) or by individual property values. The weighted ratio is the total of all assessed values divided by the total of all sale prices. Since the weighted ratio counts each dollar equally, it is swayed by higher priced properties.

In addition to the general level of assessments, we are also concerned with the relative spread or variation that individual ratios fall from the typical. There are two measurements of variability: coefficient of dispersion and coefficient of variation. These statistics measure horizontal inequities, or the dispersion of ratios regardless of the value of the individual properties. The coefficient of dispersion is calculated by dividing the average absolute deviation by the median ratio. The average absolute deviation is calculated by subtracting the median ratio from each ratio, adding all the results but ignoring positive and negative signs, and dividing by the number of ratios. Acceptable coefficients of dispersion depend on property type but should typically be 20% or less. Coefficient of variation is calculated by dividing the standard deviation by the mean or average ratio and multiplying by 100. The variance is calculated by subtracting the mean from each ratio, squaring the differences, summing the squared differences, dividing by the total number of ratios less one. The standard deviation is calculated by taking the square root of the variance. The coefficient of dispersion is the preferable measure of variance unless a sample is normally distributed. In a normal distribution situation, coefficient of variation is the preferable measure of variance.

Another statistical measure used to gauge assessment uniformity is the Price Related Differential (PRD). The PRD tests to see if higher or lower valued properties are assessed at the same level. It is calculated by dividing the average ratio by the weighted ratio. This statistic measures vertical inequities. When low-value properties are valued at a higher percentage of their market value, the property taxes levied against these assessments would be considered regressive.

Conversely, if high-value properties are valued at a higher percentage of their market value, property taxes levied against these assessments would be considered progressive. Typically, PRDs have an upward bias because higher priced properties are more unique. PRDs should range between 0.98 and 1.03, except for very small samples. For example, a PRD of 1.03 indicates under valuation of high priced properties, while a PRD of .98 shows an under valuation of low priced properties.

Other descriptive statistical methods that may be used to analyze the assessment product are histograms, frequency distributions, and scatter diagrams. Due to the scope of this report, we have not examined them here. For further information on statistics relating to assessments, please refer to the International Association of Assessing Officers' publication "Improving Real Property Assessment".

Table I is the Fiscal Year 2014 Real Property Base/Ratio by Subdivision with assessment ratios expressed relative to full value. Table II is a history of weighted assessment ratios converted to full value (100% levels) that allows for comparison between years by adjusting for statutory changes in the assessment level. Table III displays examples of the statistical calculations used in this report.

Tables IV and V show the residential and commercial 2013 Ratio Study data by jurisdiction at assessed full market value level for the area most recently assessed. Following the ratio study is Table VI of the report detailing issues of assessment and appraisal quality that are summarized in Section IV.

### **SECTION III – RATIO STUDY STANDARDS VALUES TO SALE PRICES**

The International Association of Assessing Officers (IAAO) is a professional organization of assessing officials which provides educational programs, assessment administration standards, and research on appraisal and tax policy issues. IAAO has developed numerous standards and texts on appraisal and assessment administration. Additionally, the organization is a founding member of the national Appraisal Foundation which developed the Uniform Standards of Professional Appraisal Practice (USPAP).

IAAO's Standard on Ratio Studies was first published in September 1980 and was revised in January 2010. The Standard is advisory in nature. This Standard provides guidance to those performing ratio studies in the mass appraisal field regarding the design, statistics, performance measures and other issues related to such studies. The Maryland Department of Assessments and Taxation uses the fundamental ratio statistical measures of the Standard and has adopted IAAO's Assessment Ratio Performance Standard as the criteria to judge the performance of Maryland revaluations.

The IAAO Ratio Performance Standards are:

**Ratio Study Uniformity Standards Indicating Acceptable General Quality\***

General Property Class	Jurisdiction Size /Profile /Market Activity	Max COD
Residential improved (single family dwellings, condominiums, manuf. housing, 2-4 family units)	Very large jurisdictions / densely populated / newer properties / active markets	5.0 to 10.0
	Large to mid-sized jurisdictions / older & newer properties / less active markets	5.0 to 15.0
	Rural or small jurisdictions / older properties / depressed market areas	5.0 to 20.0
Income-producing properties (commercial, industrial, apartments,)	Very large jurisdictions / densely populated / newer properties / active markets	5.0 to 15.0
	Large to mid-sized jurisdictions / older & newer properties / less active markets	5.0 to 20.0
	Rural or small jurisdictions / older properties / depressed market areas	5.0 to 25.0
Residential vacant land	Very large jurisdictions / rapid development / active markets	5.0 to 15.0
	Large to mid-sized jurisdictions / slower development / less active markets	5.0 to 20.0
	Rural or small jurisdictions/ little development / depressed markets	5.0 to 25.0
Other (non-agricultural) vacant land	Very large jurisdictions / rapid development / active markets	5.0 to 20.0
	Large to mid-sized jurisdictions / slower development / less active markets	5.0 to 25.0
	Rural or small jurisdictions/ little development / depressed markets	5.0 to 30.0

*These types of property are provided for general guidance only and may not represent jurisdictional requirements.  
\*The COD performance recommendations are based upon representative and adequate sample sizes, with outliers trimmed and a 95% level of confidence.*

*\*Appraisal level recommendation for each type of property shown should be between 0.90 and 1.10.*

*\*PRD's for each type of property should be between 0.98 and 1.03 to demonstrate vertical equity.*

*PRD standards are not absolute and may be less meaningful when samples are small or when wide variation in prices exist. In such cases, statistical tests of vertical equity hypotheses should be substituted.*

*\*CODs lower than 5.0 may indicate sales chasing or non-representative samples.*

Source: Standard on Ratio Studies; International Association of Assessing Officers; Kansas City, MO; January 2010; pg 33.

Ratio studies may be performed for various reasons including appraisal accuracy and assessment equity studies, to judge the need for management of a reappraisal, to identify problems with appraisal procedures, to assist in market analysis, and to adjust appraised values. Many ratio study design issues must be considered depending on the purpose of the ratio study.

This study considers unadjusted sales price data six months prior to and six months after the date of finality (date of valuation, January 1<sup>st</sup>) for which assessments have become effective so that an unbiased estimate of assessment performance can be obtained. Sales that are arms-length transactions between willing and informed buyers and sellers are used in this study. Maryland's ratio performance is good and conforms to the IAAO Standard.

While several measures of central tendency are calculated (average, median, and weighted ratios), the median is less affected by extreme ratios. The IAAO observes in its Standard that the median is generally the preferred measure of central tendency for monitoring appraisal performance. For this reason, median ratios are used in this study to measure compliance with IAAO standards.

As a proxy for time adjustments, this report uses sales from six months before the date of finality to six months after the date of finality. Under normal circumstances, with steadily changing property values, these sales will balance. In unusual circumstances, when property values are rapidly changing, this will affect the ratio statistics.

On average, the residential values in this group have decreased by 7% while commercial property values showed an increase in 13 of the 24 subdivisions, with an overall average increase of 11% statewide.

Property value changes varied by region in the state since the last triennial revaluation in January, 2010. The largest percentage of decrease in residential property was in Baltimore, Caroline, Prince George's, Wicomico and Worcester Counties.

Statewide, the Department met the IAAO standard for coefficient of dispersion indicating an overall uniformity of assessments.

Commercial properties are generally less similar than residential properties. Many commercial properties are income producing and are valued using the income approach to value. Most commercial uses are cyclical in nature. Various segments of the commercial real estate market may be ascending in value as a class, while others may be declining in market popularity. Because of the uniqueness of commercial and industrial properties, measures of central tendency tend to vary more widely than with residential properties.

The number of commercial properties is small compared to the number of residential properties. In several jurisdictions, the number of commercial properties which have sold is so small that the statistical measures are prone to bias. Allegany, Caroline, Carroll, Cecil, Dorchester, Garrett, Harford, Kent, St. Mary's, Somerset and Wicomico Counties all had fewer than 10 arms-length commercial transfers for Group 1. In those jurisdictions, individual statistical measures would be unreliable due to sample size.

The number of commercial sales decreased from 360 statewide in the 2012 Ratio Report to 357 statewide in the 2013 Ratio Report.

#### **SECTION IV – STATEWIDE COMPARISON OF DEPARTMENT'S VALUES TO SALE PRICE**

Quality is the degree of excellence of a product or service; the extent to which it measures up to certain standards. In this case, a measure of quality is the ratio study measuring whether the assessor appraised properties uniformly at market value. The ratio study conducted in this report is based upon sales data occurring, for the most part, after the time period of sales used by the assessor in the group of properties being reassessed.

Assuming the assessor applied the mass appraisal model uniformly to all properties, this ratio study should show uniformity of assessment. This ratio study is a cross check by Department management to assure quality of the mass appraisal work product. The ratio statistics for each

county in Table IV was conducted on 15,718 improved residential property sales from July 1, 2012 to June 30, 2013 and compares the Department's valuations to sale prices.

The frequency distribution in Table VI and statistics following present a statewide ratio analysis of improved residential property sales from July 1, 2012 to June 30, 2013 comparing the Department's values to sales prices. The measures of central tendency indicate that properties are valued at approximately 91% of sale price and that on average all other properties have very similar ratios as indicated by the 10.22 Coefficient of Dispersion. Additionally, higher valued properties are assessed at a similar level to lower valued properties as indicated by a Price Related Differential statistic of 1.01. A price related differential of 1.00 indicates vertical uniformity across all strata of property values.

The analysis from Table VI and the following descriptive statistics indicates that values determined by assessors for the most recent triennial Group 1 valuation attained a uniform and appropriate level of value. At the time of valuation, the assessments were close to the sale price.

In summary, the data shows that properties throughout the State are assessed uniformly as required by law.



**TABLE 1**  
**Fiscal Year 2014 Real Property Tax Base/Ratio by Jurisdiction**

This table shows the taxable assessable base and ratios of real property used for different purposes. Ratios shown are median ratios of arms-length sales of properties in Group 1 that were sold between July 1, 2012 and June 30, 2013, compared with the Department's January 1, 2013 assessed value. In jurisdictions with fewer than 10 commercial sales, the statewide ratio is used (see Table V). A ratio of 100% is used for property not assessed on market value.

	Number of Properties	Residential Base	Residential Ratio	Commercial Base	Commercial Ratio	Agricultural Base	Agricultural Ratio	Use Value Base	Use Value Ratio	Total Base	Weighted Ratio
Allegany	38,675	2,601,196,786	94.4%	835,288,307	94.7%	127,049,773	94.4%	3,121,700	100.0%	3,566,656,566	94.5%
Anne Arundel	204,362	57,576,571,995	91.9%	16,079,326,521	88.9%	467,949,861	91.9%	16,216,366	100.0%	74,140,064,743	91.2%
Baltimore City	218,608	23,777,461,489	92.6%	14,451,650,003	98.8%	0	0	0	100.0%	38,229,111,492	94.8%
Baltimore	280,596	55,148,939,353	86.6%	20,530,732,901	90.5%	1,023,888,900	86.6%	65,493,334	100.0%	76,769,054,488	87.6%
Calvert	41,654	9,761,865,375	89.9%	1,304,554,935	95.0%	272,463,465	89.9%	1,870,700	100.0%	11,340,754,475	90.5%
Caroline	16,017	1,801,757,197	94.3%	392,746,331	94.7%	364,609,748	94.3%	516,100	100.0%	2,559,629,376	94.4%
Carroll	64,517	14,762,223,564	91.0%	2,198,942,577	94.7%	980,397,234	91.0%	10,482,033	100.0%	17,952,045,408	91.5%
Cecil	45,823	6,963,756,250	94.8%	1,830,995,567	94.7%	504,922,966	94.8%	9,800	100.0%	9,299,684,583	94.8%
Charles	62,407	12,086,673,160	90.8%	2,839,099,101	97.2%	425,246,100	90.8%	16,952,700	100.0%	15,367,971,061	91.9%
Dorchester	22,188	2,119,708,085	98.9%	548,006,669	94.7%	300,425,000	98.9%	494,700	100.0%	2,968,634,454	98.1%
Frederick	91,260	19,210,535,284	89.6%	4,966,412,770	93.8%	1,228,265,914	89.6%	26,173,733	100.0%	25,431,387,701	90.4%
Garrett	28,345	3,939,009,993	89.7%	454,243,067	94.7%	226,535,987	89.7%	0	100.0%	4,619,789,047	90.2%
Harford	95,884	20,213,319,163	92.4%	4,637,132,688	94.7%	777,028,364	92.4%	0	100.0%	25,627,480,215	92.8%
Howard	100,074	33,451,059,817	90.4%	8,784,130,762	87.5%	401,985,733	90.4%	0	100.0%	42,637,176,312	89.8%
Kent	12,933	2,188,848,437	97.3%	397,819,434	94.7%	395,127,364	97.3%	477,700	100.0%	2,982,272,935	96.9%
Montgomery	318,200	125,999,743,492	90.7%	34,591,754,030	95.0%	624,017,410	90.7%	104,669,866	100.0%	161,320,184,798	91.6%
Prince George's	274,428	50,218,399,916	86.8%	22,762,942,815	100.9%	54,198,067	86.8%	23,797,600	100.0%	73,059,338,398	90.7%
Queen Anne's	25,089	5,989,313,225	94.8%	911,919,436	98.1%	762,570,696	94.8%	823,800	100.0%	7,664,627,157	95.2%
St. Mary's	47,064	9,577,609,299	95.4%	1,580,432,135	94.7%	618,491,802	95.4%	10,466,300	100.0%	11,786,999,536	95.3%
Somerset	16,079	1,020,477,088	96.4%	254,487,800	94.7%	140,728,531	96.4%	1,263,680	100.0%	1,416,957,099	96.1%
Talbot	20,569	6,804,011,094	94.2%	989,323,146	91.0%	1,010,030,272	94.2%	9,880,633	100.0%	8,813,245,145	93.8%
Washington	56,097	7,915,216,924	92.2%	3,434,098,651	87.4%	568,949,593	92.2%	10,263,267	100.0%	11,928,528,435	90.8%
Wicomico	44,827	4,144,142,253	89.9%	1,402,435,901	94.7%	290,671,501	89.9%	3,215,400	100.0%	5,840,465,055	91.0%
Worcester	64,979	12,090,258,151	88.3%	2,361,351,346	98.0%	283,273,899	88.3%	110,000	100.0%	14,734,993,396	89.7%
Statewide	2,190,675	489,362,097,390	90.3%	148,539,826,893	94.7%	11,848,828,180	90.3%	306,299,412	100.0%	650,057,051,875	91.3%

**TABLE II**  
**Assessment Levels**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Allegany	96.8	92.6	95.6	96.4	98.5	93.4	99.9	95.2	95.0	93.0	89.6	90.1	90.0	91.8	94.5%
Anne Arundel	93.0	90.9	90.6	89.8	87.4	84.4	84.5	85.6	96.0	95.2	95.1	90.3	89.7	90.2	91.2%
Baltimore City	92.8	90.5	94.7	94.3	94.9	95.0	74.3	85.2	92.0	94.7	91.6	91.4	91.3	95.8	94.8%
Baltimore	92.9	94.1	93.0	91.3	92.7	86.5	88.5	83.5	94.0	94.6	94.8	91.5	93.6	93.0	87.6%
Calvert	94.2	93.6	92.4	90.4	87.3	82.1	82.3	85.6	95.0	95.4	96.0	94.0	91.7	90.6	90.5%
Caroline	96.2	94.3	92.7	92.2	88.3	87.3	81.7	88.9	95.0	95.3	92.8	95.7	97.2	98.1	94.4%
Carroll	95.3	94.0	92.1	92.0	89.5	86.6	85.9	89.7	96.0	97.1	94.0	89.5	93.2	90.5	91.5%
Cecil	88.4	94.0	93.1	92.0	91.8	88.9	86.0	91.0	94.0	94.9	94.9	91.6	87.2	91.2	94.8%
Charles	95.1	94.3	92.6	92.0	88.6	88.9	87.1	88.0	94.0	96.4	93.4	92.1	92.2	92.2	91.9%
Dorchester	93.4	94.3	92.9	89.1	89.3	85.4	67.0	79.3	91.0	96.9	90.2	95.3	91.2	90.8	98.1%
Frederick	95.0	92.8	89.0	90.2	87.4	88.9	83.7	90.9	96.0	98.2	95.6	89.2	93.0	89.2	90.4%
Garrett	96.2	93.4	94.6	93.7	83.8	91.6	88.6	91.8	95.0	92.7	91.0	89.9	98.1	90.6	90.2%
Harford	93.1	92.2	92.6	89.1	88.2	85.0	85.5	85.0	93.0	96.1	92.8	91.6	91.2	94.2	92.8%
Howard	93.9	95.1	92.0	92.2	90.1	88.2	89.8	92.5	97.0	96.5	93.1	88.2	89.6	91.3	89.8%
Kent	95.8	91.4	91.0	92.0	92.6	87.3	86.0	83.9	94.0	95.2	91.0	90.8	94.8	98.5	96.9%
Montgomery	95.7	93.8	92.1	88.2	91.0	93.3	93.2	95.5	98.0	96.4	95.4	88.4	92.9	92.9	91.6%
Prince George's	96.2	94.7	94.0	91.0	90.5	83.8	83.0	85.1	91.0	98.2	96.4	95.3	92.8	92.9	90.7%
Queen Anne's	98.2	91.5	92.6	93.8	90.5	86.8	88.7	87.9	96.0	96.4	91.1	90.6	93.6	92.2	95.2%
St. Mary's	96.1	95.3	93.7	93.1	89.5	83.8	80.4	88.2	95.0	97.9	96.6	93.3	94.5	94.5	95.3%
Somerset	97.2	94.0	93.6	94.5	94.5	85.2	85.5	86.2	86.0	92.5	89.3	85.0	91.5	87.9	96.1%
Talbot	92.2	93.1	89.7	84.4	87.4	89.6	83.3	88.7	96.0	98.0	93.9	93.8	97.7	96.8	93.8%
Washington	95.8	90.9	93.7	92.6	89.1	91.1	87.4	90.0	97.0	97.2	91.8	92.9	95.4	90.7	90.8%
Wicomico	94.3	93.4	91.8	91.8	89.8	90.6	84.0	82.9	89.0	90.3	88.9	89.1	90.6	89.4	91.0%
Worcester	90.7	89.5	84.5	89.4	76.8	86.8	83.2	89.2	97.0	93.9	93.9	92.2	89.5	91.4	89.7%
Statewide	94.4	93.3	92.1	90.5	90.0	88.2	86.0	89.7	96.0	95.7	94.0	91.0	92.0	91.7	91.3%

**TABLE III**  
**Illustrated Ratio Study Statistics**

(1.) Property Number	(2.) Sale Price	(3.) Assessed Value	(4.) Ratio A/S %	(5.) Absolute Deviation from Median
1	28,000	22,400	80%	20%
2	22,000	19,250	88%	12%
3	63,500	55,575	88%	12%
4	55,900	51,700	92%	7%
5	20,000	19,000	95%	5%
6	21,000	20,475	98%	2%
7	80,000	80,000	100%	0%
8	40,000	40,000	100%	0%
9	33,000	33,300	101%	1%
10	45,000	46,125	103%	3%
11	24,000	25,200	105%	5%
12	39,000	41,925	108%	8%
13	37,000	41,625	113%	13%
14	40,300	45,800	114%	14%
15	51,000	59,925	118%	18%
<b>TOTAL</b>	<b>599,700</b>	<b>602,300</b>	<b>1500%</b>	<b>120%</b>

<b>Average Ratio</b>	=	Total of Ratios (4.) 1500%	÷	Number of Sales (1.) 15	=	100%
<b>Weighted Ratio</b>	=	Total of Assessed Values (3.) 602,300	÷	Total of Sale Prices (2.) 599,700	=	100%
<b>Average Deviation</b>	=	Total Deviations (5.) 120%	÷	Number of Sales (1.) 15	=	8%
<b>Median Ratio</b>	=	Middle Value of Data Array 100% (i.e. property #8)			=	100%
<b>Coefficient of Dispersion</b>	=	Average Deviation (5.) 8%	÷	Median Ratio (4.) 100%	=	7.98
<b>Price Related Differential</b>	=	Average Ratio (4.) 100%	÷	Weighted Ratio 100%	=	1.00

**TABLE IV**  
**2013 Residential Ratio Study**

This table shows arms-length sales of improved residential and condominium properties in Group 1 from July 1, 2012 through June 30, 2013. Ratios compare the Department's January 1, 2013 value to the actual sale price.

	Number of Sales	Average Ratio	Median Ratio	Weighted Ratio	Average Deviation	Coefficient of Dispersion	Price Related Differential	Standard Deviation	Coefficient of Variation	Median Sale Price
Allegany	69	94.0%	94.4%	94.3%	4.2%	4.40	1.00	0.06	6.03	\$135,000
Anne Arundel	1,795	93.4%	91.9%	91.5%	10.5%	11.48	1.02	0.14	15.13	\$350,000
Baltimore City	1,067	93.0%	92.6%	89.9%	12.8%	13.78	1.04	0.17	18.61	\$166,000
Baltimore	1,905	87.2%	86.6%	85.5%	9.3%	10.79	1.02	0.13	14.45	\$220,000
Calvert	269	90.0%	89.9%	90.1%	6.2%	6.93	1.00	0.09	9.62	\$404,000
Caroline	55	96.4%	94.3%	96.5%	7.9%	8.33	1.00	0.10	10.28	\$180,000
Carroll	634	90.9%	91.0%	90.3%	6.2%	6.84	1.01	0.08	8.77	\$324,900
Cecil	221	95.7%	94.8%	93.7%	9.1%	9.55	1.02	0.13	13.14	\$185,000
Charles	505	91.5%	90.8%	90.6%	7.0%	7.72	1.01	0.10	11.00	\$267,070
Dorchester	37	97.7%	98.9%	94.9%	9.9%	9.98	1.03	0.13	12.95	\$152,200
Frederick	1,059	89.4%	89.6%	89.1%	7.0%	7.80	1.00	0.09	10.43	\$360,000
Garrett	41	89.2%	89.7%	87.2%	8.7%	9.66	1.02	0.13	14.16	\$99,000
Harford	424	92.4%	92.4%	91.2%	7.4%	8.05	1.01	0.10	10.35	\$305,000
Howard	1,016	90.2%	90.4%	90.0%	6.3%	7.00	1.00	0.08	9.10	\$445,000
Kent	28	98.6%	97.3%	96.0%	13.5%	13.89	1.03	0.17	16.96	\$191,250
Montgomery	3,579	91.0%	90.7%	90.1%	8.8%	9.71	1.01	0.12	13.40	\$489,000
Prince George's	1,350	87.5%	86.8%	85.7%	10.6%	12.21	1.02	0.14	15.99	\$231,375
Queen Anne's	185	94.2%	94.8%	93.7%	7.7%	8.14	1.01	0.10	10.94	\$325,000
St. Mary's	203	96.2%	95.4%	95.1%	8.3%	8.66	1.01	0.11	11.85	\$285,000
Somerset	13	97.6%	96.4%	98.2%	9.0%	9.36	0.99	0.12	11.80	\$85,000
Talbot	246	96.3%	94.2%	94.0%	10.9%	11.53	1.03	0.15	15.73	\$260,000
Washington	355	91.4%	92.2%	90.7%	6.3%	6.86	1.01	0.08	9.07	\$225,000
Wicomico	278	89.5%	89.9%	85.5%	11.9%	13.25	1.05	0.17	18.82	\$130,000
Worcester	384	89.2%	88.3%	87.9%	8.8%	9.96	1.01	0.12	13.10	\$222,000
<b>Statewide</b>	<b>15,718</b>	<b>90.8%</b>	<b>90.3%</b>	<b>89.8%</b>	<b>9.2%</b>	<b>10.22</b>	<b>1.01</b>	<b>0.13</b>	<b>13.98</b>	<b>\$304,000</b>

**TABLE IV-B**  
**Statewide Residential Ratio Study Frequency Statistics**

<b>Average Ratio</b>			
<u>Total of Ratios</u> Number of Sales	=	<u>14269.11</u> 15,718	= 90.78%
<b>Weighted Ratio</b>			
<u>Total Assessed Values</u> Total Sales Prices	=	<u>5,169,294,100</u> 5,758,717,188	= 89.76%
<b>Average Deviation</b>			
<u>Total Deviations</u> Number of Sales	=	<u>1,450</u> 15,718	= 9.23%
<b>Coefficient of Dispersion</b>			
<u>Average Absolute Deviation</u> Median Ratio / 100	=	<u>0.0923</u> 90%	= 10.22
<b>Price Related Differential</b>			
<u>Average Ratio</u> Weighted Ratio	=	<u>90.78%</u> 89.76%	= 1.01

**TABLE V**  
**Commercial Ratio Study 2013**

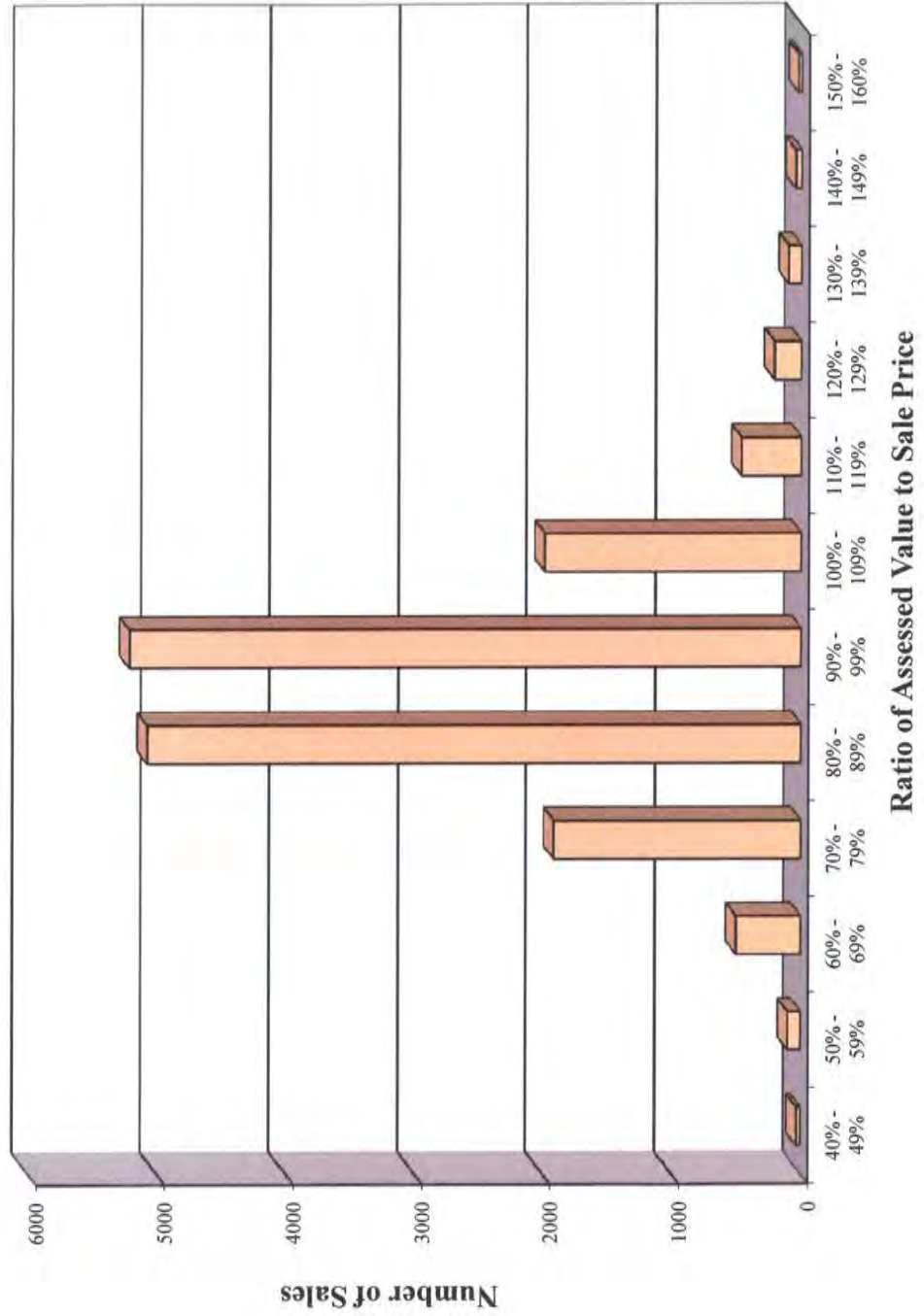
The table below shows statistics on arms-length sales between July 1, 2012 and June 30, 2013 of commercial property in assessment Group 1. Ratios compare the Department's January 1, 2013, value to the actual sale price.

Ratio statistics are shown for all jurisdictions, even where the number of sales is so small that there is not a sufficient sample to provide accurate statistics. In cases where there are fewer than 10 sales, the ratio statistics are not used to calculate the base (Table I).

	Number of Sales	Total Assessed Values	Total Sales Prices	Weighted Ratio	Average Ratio	Median Ratio
Allegany	2	608,900	609,900	99.8%	98.2%	98.2%
Anne Arundel	23	51,780,600	73,863,000	70.1%	94.2%	88.9%
Baltimore City	54	62,240,500	65,340,231	95.3%	97.0%	98.8%
Baltimore County	53	198,536,800	241,775,511	82.1%	87.2%	90.5%
Calvert	11	9,683,600	11,905,000	81.3%	90.1%	95.0%
Caroline	2	464,100	584,000	79.5%	87.4%	87.4%
Carroll	4	3,747,000	4,485,000	83.5%	77.5%	75.6%
Cecil	8	4,199,000	6,239,700	67.3%	78.6%	85.0%
Charles	21	36,255,600	47,710,845	76.0%	100.5%	97.2%
Dorchester	0	N/A	N/A	N/A	N/A	N/A
Frederick	22	66,925,700	72,176,965	92.7%	94.9%	93.8%
Garrett	2	311,200	305,000	102.0%	103.1%	103.1%
Harford	6	3,119,200	3,820,000	81.7%	94.3%	87.7%
Howard	15	33,624,200	50,189,849	67.0%	84.7%	87.5%
Kent	0	N/A	N/A	N/A	N/A	N/A
Montgomery	35	444,819,300	499,088,183	89.1%	88.5%	95.0%
Prince George's	29	127,368,700	148,948,494	85.5%	105.6%	100.9%
Queen Anne's	12	6,539,300	7,342,072	89.1%	94.9%	98.1%
St. Mary's	6	2,833,300	3,344,151	84.7%	85.9%	86.1%
Somerset	0	N/A	N/A	N/A	N/A	N/A
Talbot	18	13,155,700	15,354,924	85.7%	87.4%	91.0%
Washington	10	4,398,200	4,876,800	90.2%	90.4%	87.4%
Wicomico	8	1,950,100	2,499,713	78.0%	87.7%	89.9%
Worcester	16	7,775,000	7,112,250	109.3%	105.3%	98.0%
<b>Statewide</b>	<b>357</b>	<b>\$1,080,336,000</b>	<b>\$1,267,571,588</b>	<b>85.2%</b>	<b>93.1%</b>	<b>94.7%</b>

**TABLE VI**  
**Number of Residential Sales Sorted by Ratio**

The chart below compares the number of improved residential sales for July 1, 2012 to June 30, 2013 to their ratio of assessed value to sale price.





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