Ratio Study Analysis
As of July 1, 2010

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Prepared for
Montana Department of Revenue

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Contents

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1. Executive Summary

The Montana Department of Revenue commissioned Almy, Gloudemans, Jacobs & Denne to conduct a series of market price trend and sales ratio studies to monitor assessment levels and related performance measures subsequent to the 2009 revaluation. The studies are designed to measure assessment performance at various points in time and help formulate assessment policies and strategies until the next general revaluation, including possible indexing of values to recognize changing market conditions.

This study is the third in the series and compares 2009 assessed values against sales prices adjusted to July 1, 2010, two years subsequent to the revaluation date. It produces estimates of price level changes since the reassessment and calculates assessment levels and various assessment uniformity measures as of July 1, 2010. While our prior studies analyzed assessment performance on a regional level by each of the state's nine major economic areas (see table and map at the end of this section), this study drills down to the market area level for residential property for each of the 66 market areas used in the revaluation. Commercial results are stratified by economic area, as well as by major commercial property types: apartments, offices, retail, warehouses, and other.

The studies are based on assessed values, sale price data, and other property data supplied by the Department. Sales data used in this study span the 42-month period, January 2007 through June 2010. Changes in price levels are reported for the full 42-month study period, for the 18 months prior to the revaluation, and for the 24-months since the revaluation. In all, over 35,000 market transactions were used in the study.

Section 2 describes the methodology used in the study. Section 3 reports results for residential properties. Section 4 reports results for commercial properties. Sections 3 and 4 are further divided into three subsections: price trend analyses, treatment of outliers, and ratio study analyses and results.

The table below shows statewide median assessment-to-sales ratios for improved residential and commercial properties for our current report and two prior reports. On a statewide basis assessments remain closely centered on market value and strongly conform to standards set by the International Association of Assessing Officers (IAAO), which call for a median assessment ratio of 0.90 to 1.10.

	Median Ratio 1 Jan 2009	Median Ratio Sep 2009	Median Ratio 1 July 2010
Residential	.998	.996	1.004
Commercial	.965	.979	0.960

While residential values generally changed only modestly in the majority of the state since the revaluation, some areas declined significantly, resulting in assessment levels well above 100% of market value. Since the revaluation, we estimate that residential values fell more than 10% in two economic areas (85 and 91) and by 8.9% in area 81. Values fell by 10% or more in 20 of 66 market areas, including the majority of those in economic areas 81, 85, and 91.

We estimate with 95% confidence that the median assessment level for residential property is in excess of 110% in two economic areas (81 and 85) and in 18 of the 66 market areas. In fact, the median assessment ratio in economic area 85 and in eight market areas exceeds 1.20.

At the same time, 24 market areas saw modest appreciation in residential values since the revaluation, while eight were unchanged. The other 14 market areas experienced declines of less than 10%. The table below summarizes value changes for residential properties in the 9 economic areas and 66 market areas.

Percentage Change in Values June 2008 – June 2010	Number of Economic Areas	Number of Market Areas
Increase of < 10%	4	24
No Change	0	8
Decline of < 10%	3	14
Decline of 10% or more	2	20

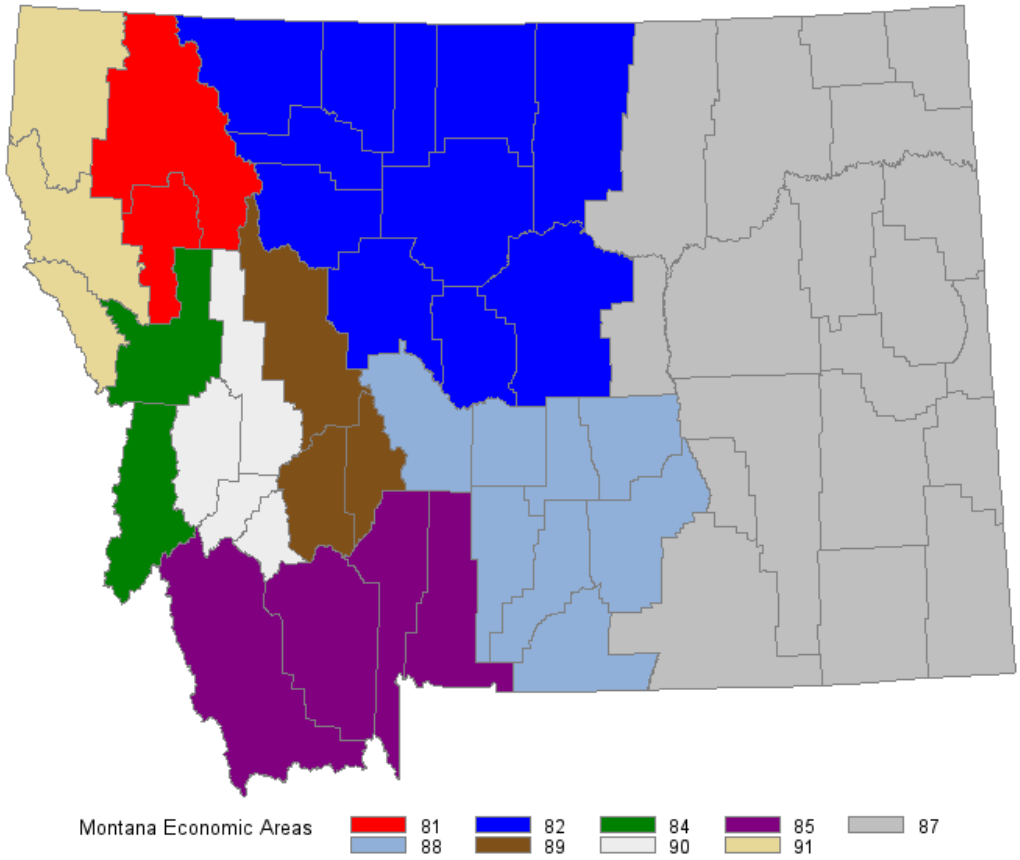
Although assessment uniformity within each market area remains generally good, the uneven pattern of value changes across Montana since the reappraisal date has caused assessment uniformity among residential properties overall to decline. The primary measure of assessment uniformity is the coefficient of dispersion (COD), which measures the average percentage variation around the median ratio. On a statewide basis, the measure, which stood at 10.0% in our prior study, now stands at 14.1%, which is still within the IAAO standards for acceptable uniformity.

In summary, while residential assessment levels were consistently near 1.00 after the reappraisal, differences in price trends among different areas of the state resulted in some disparities by July 2010, which have caused assessment uniformity across the state (as measured by the COD) to decline.

Commercial values changed little in most of the state following the revaluation with the result that assessment performance remains relatively good. The overall statewide median ratio is 0.96 and median ratios are between 0.90 and 1.05 for all major property types and in seven of nine economic areas. The median ratio for area 90, which experienced strong price appreciation during the first part of our study period, is .830. In area 91, where values declined 10% since the revaluation, the median is 1.113. Coefficients of dispersion are reasonably good for commercial properties and assessment levels are consistent between lower and higher value properties

The analyses and results that follow present a detailed snapshot of assessment performance in Montana as of July 1, 2010. While the picture remains generally good, changing market conditions have resulted in areas of under-valuation and, more seriously, over-valuation, particularly for residential properties in certain parts of the state. The traditional approach to such problems is targeted revaluations or the application of market adjustment factors designed to bring assessment levels into alignment. We hope our report helps quantify the current picture and assists in the evaluation of policy alternatives until the next full revaluation.

Montana Economic Areas



Counties Comprising Montana Economic Areas

81	Flathead and Lake county
82	Blaine, Cascade, Chouteau, Fergus, Glacier, Hill, Judith Basin, Liberty, Pondera, Teton, and Tool county
84	Missoula and Ravalli county
85	Beaverhead, Gallatin, Madison, and Park county
87	Big Horn, Carter, Custer, Daniels, Dawson, Fallon, Garfield, McCone, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Treasure, Valley, and Wibaux county
88	Carbon, Golden Valley, Meagher, Musselshell, Stillwater, Sweet Grass, Wheatland, Yellowstone
89	Broadwater, Jefferson, and Lewis & Clark county
90	Anaconda - Deer Lodge, Butte - Silver Bow, Granite, and Powell county
91	Lincoln, Mineral, and Sanders county

2. Methodology

Ratio studies are the chief means by which assessment performance is measured. In a ratio study, assessed values are compared against surrogates for market value, usually sales prices. If assessment performance is good, assessed values should be closely related to sales prices. Ratio studies measure the degree of relationship.

$$\text{Ratio} = \text{Assessed Value} \div \text{Sale Price}$$

Ideally the middle or average ratio should be near 1.0, and the individual ratios should be relatively uniform or consistent.

The primary guideline on how to perform such studies is the *Standard on Ratio Studies* (IAAO 2007). Our study follows the methodology outlined in the IAAO standard. This section describes our procedures and methodology.

2.1 Data Assembly

The Montana Department of Revenue provided all the data used in our study. Department staff regularly screens sales as valid or invalid for appraisal and sales ratio analyses and provided us sales coded as valid, although not all had been verified with a party to the transfer. The data were provided on two files: one that included residential sales and one that included commercial sales. We converted the data to the statistical package, SPSS (Statistical Package for the Social Sciences) for analysis. Multiple-parcel commercial sales were aggregated to single records for analysis. The present study uses sales from January 2007 through June 2010[1]. All sales are adjusted to market value as of July 1, 2010.

The data were edited to remove invalid or otherwise unusable or atypical records. The primary edits in this regard were as follows:

- Exempt property or easements.
- Sale type does not match property type, for example, a vacant land sale for a subsequently improved property.
- Missing or abnormally low sale price.
- Missing or abnormally low assessed value.
- Year built greater than sale year.
- Improved property sale with little building value (generally less than 20% of total value).
- Atypical or difficult-to-analyze commercial properties (e.g., amusement parks, parking garages, and hotels/motels) where a significant portion of the sale price can be attributable to non-real estate components.

2.2 Price Trend Analysis

The base or target date in our analysis is July 1, 2010, two years after the valuation date of July 1, 2008. Because sales occur at different dates, it is important that all sales be adjusted to their equivalent price as of the analysis date (July 1, 2010). As in prior analyses, price trends were developed using sales ratio trend analysis, which is likely the most common method used by mass appraisers to track and quantify

[1] No sales were available for market area 12-04 (Hill County – Harve) after 2008. Sales in the market area were time-adjusted to December 2008.

price trends. In the method, sales prices over the time frame selected for analysis are compared against assessed values for the most recent assessment year. Since the assessments reflect a common, fixed date and the sales prices reflect transaction dates, an upward trend in sale/assessment (S/A) ratios indicates price appreciation and a downward trend indicates price deflation. A graph of the ratios will show the direction and magnitude of the trend.

Exhibit 2-1 below provides an example of a market area (Great Falls) that displayed a moderate upward price trend (7%) over the study period. Exhibit 2-2 contains an example of a market area (Big Sky condominiums in Gallatin County) that suffered a sharp decline (42%). Price trends were segmented into up to three "splines" or spans over the study period. Regression analysis was used to quantify the trends. A separate analysis was conducted for residential properties in each of 66 market areas and for commercial properties in each of 9 economic regions. In the case of commercial properties, we looked for separate trends for apartments and commercial properties but discerned no meaningful differences.

Exhibit 2-1
Example of Upward Price Trend (Great Falls)

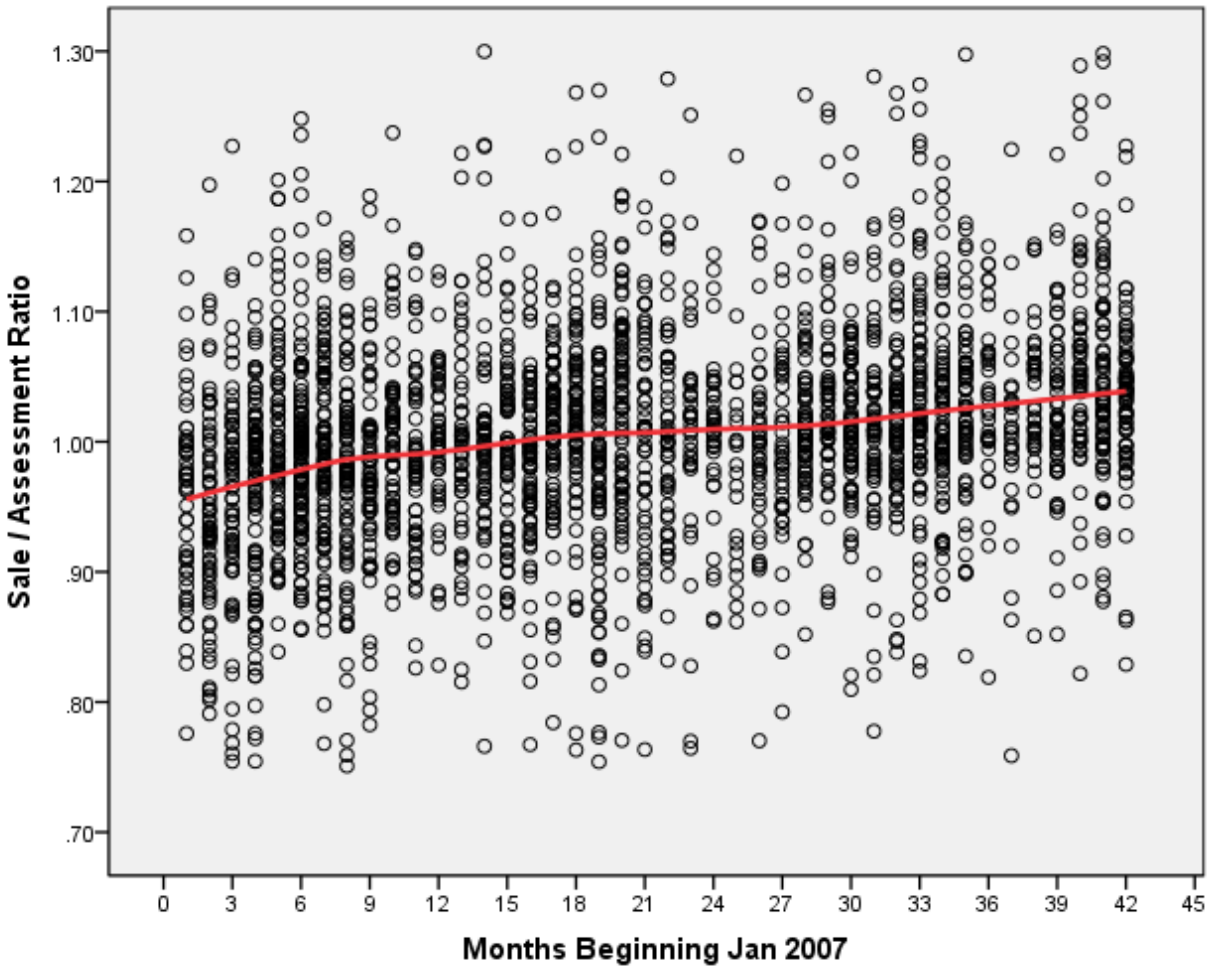
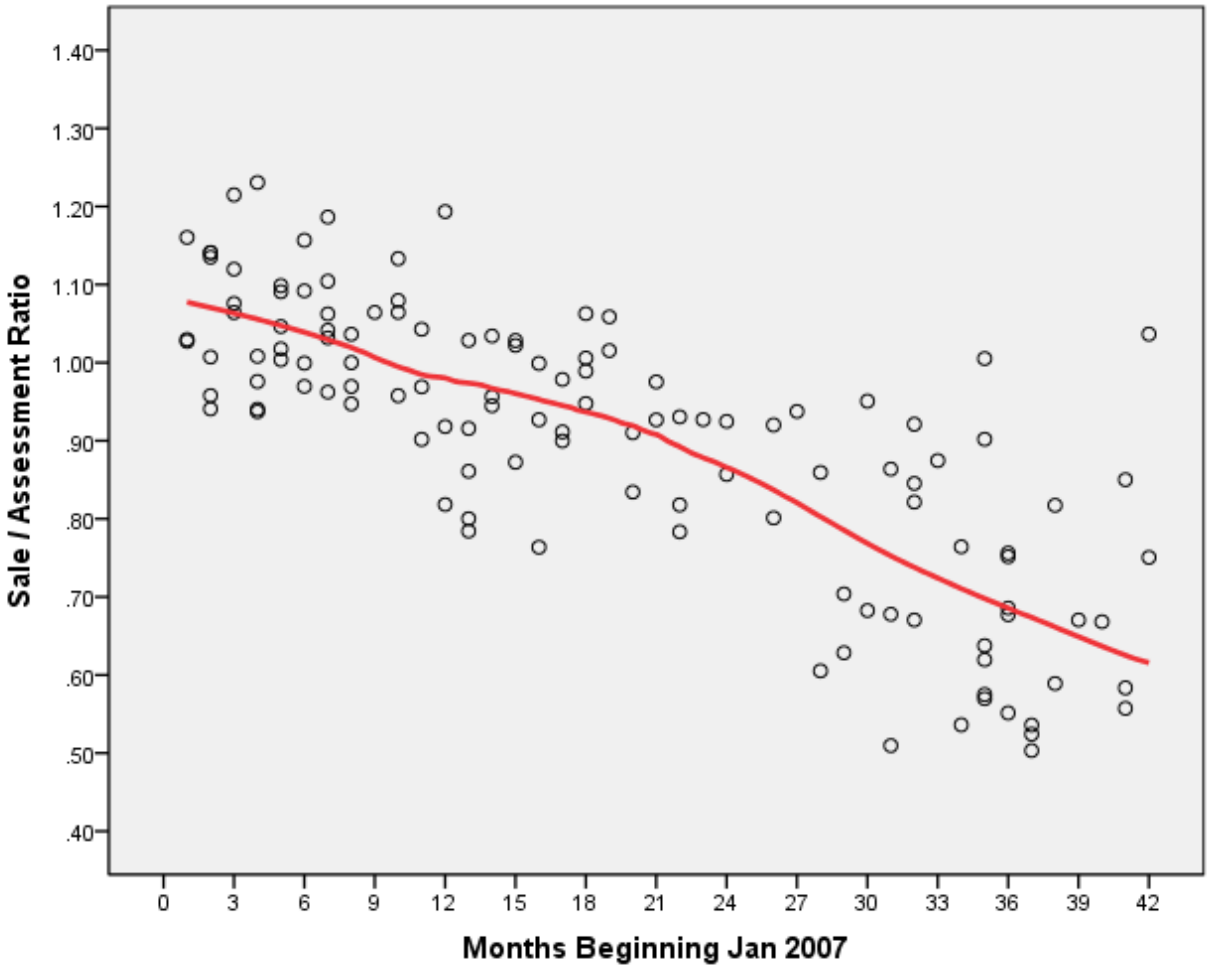


Exhibit 2-2
Example of Downward Price Trend (Gallatin Condominiums)



Once rates of change were established for each time segment, all sales prices were adjusted to July 1, 2010 at the indicated rates. The use of time adjustments enabled much larger samples, resulting in greater statistical precision and reliability, than if only sales from a short period of time were analyzed (this is all the more so due to the reduced sales activity generally observed after September 2008).

2.3 Treatment of Outliers

A common issue in ratio studies is the treatment of outliers, that is, atypically low or high ratios that can potentially distort a number of assessment performance measures.

In addition to eliminating extremely low or high sales prices, we used IAAO guidelines in determining ratio trim points based on the inter-quartile range, which represents the difference between the 75th and 25th percentiles of a distribution. For example, if the 25th percentile is 0.82 (meaning that 25% of ratios are less than 0.82) and the 75th percentile is 1.14 (meaning that 75% of ratios are lower than 1.14 and 25% are higher), the inter-quartile range (IQR) is:

$$IQR = 1.14 - 0.82 = 0.32$$

Subtracting 1.5 IQR from the 25% percentile and adding 1.5 IQR to the 75% percentile gives the bounds used to identify statistical "outliers". In our example, 1.5 x 0.32 = 0.48 and the cut points for identifying outliers are:

$$\text{Lower bound} = 0.82 - 0.48 = \underline{0.34}; \text{ Upper bound} = 1.14 + 0.48 = \underline{1.62}$$

Thus any ratios below 0.34 or greater than 1.62 are outliers and potentially could be excluded.

Similarly, adding and subtracting 3.0 IQR identifies "extremes". In our example, 3 x 0.32 = 0.96 and the cut points for identifying extreme ratios is:

$$\text{Lower bound} = 0.82 - 0.96 = \underline{-0.14}; \text{ Upper bound} = 1.14 + 0.96 = \underline{2.10}$$

Since assessed value and assessment ratios cannot be negative, the lower bound defaults to 0.

Trimming based on logarithms of ratios (which is equivalent to working with percentages) avoids cases like this and results in a more even balance of low and high outlier and extreme ratios. This is the approach we followed.

Of course, one does not have to use exactly 1.5 or 3.0 IQRs to identify appropriate trim points, which can vary with the nature of the data distribution. Nevertheless, as a general rule, when working with logarithms of the ratios, trimming based on 1.5 IQR usually excludes less than 8% of ratios (often about 5%) and trimming based on 3.0 IQR usually excludes less than 3% of the data (often about 1%).

With these guidelines in mind, we determined trim points for each property type and market area or economic area based on an examination of ratio distributions. Trim points generally range between 2.5 to 3 IQRs for residential properties and 1.5 to 2.5 IQRs for commercial properties, where outliers were more common. Specific trim points are based on logical break points in the data. The percentage of sales excluded as ratio outliers is discussed in conjunction with the ratio analyses conducted for each property type.

2.4 Statistical Analyses

There are two primary aspects of assessment performance: level and uniformity. Assessment level relates to how close overall assessments are to market value. Uniformity relates to the consistency or equity of assessed values.

Three measures of central tendency are used to describe assessment level in ratio studies: the median, the mean, and the weighted mean.

- Median. The median is the middle ratio when the ratios are arrayed from smallest to largest. There are an equal number of ratios above and below the median. Since it simply represents the middle ratio, the median is no more affected by extreme or "outlier" ratios than any other ratio in the sample. In other words, each ratio is afforded equal weight. The median is the most appropriate measure of central tendency when gauging whether assessments are centered on market value. According to IAAO standards, median ratios should fall between 0.90 and 1.10. A 95% confidence interval can be constructed about the calculated median to determine whether

one can conclude with 95% confidence that that the recommended standard has not been achieved.

- Mean. The mean ratio is simply the average ratio. It is computed by summing the ratios and dividing by the number of ratios. Like the median, the mean assigns equal weight to each sale; however, it is more affected by outliers than the median. For this reason, and because it has no offsetting advantages, the mean enjoys little prominence in ratio studies. We do not report it.

- Weighted Mean. The weighted mean weights each ratio based on its sale price; for example a sale of $1 million has 10 times the weight of a $100,000 sale (and a $5,000,000 sale has the same weight as 100 sales of $50,000 each). Because of this weighting feature, the weighted mean is the most appropriate measure for estimating the total value of property in a jurisdiction. However, the weighted mean can be disproportionately influenced by outlier ratios, particularly if they occur for high-value sales. In our studies, the weighted mean should be viewed as a secondary, dollar-weighted measure of the assessment level.

The primary measure of assessment uniformity is the coefficient of dispersion (COD), which expresses the average percentage deviation of ratios around the median. For example, a COD of .15 means that, on average, ratios differ from the median by 15%. In general, lower CODs indicate better assessment uniformity. However, as properties become more complex and heterogeneous and as markets become thin or unstable, good CODs are more difficult (or impossible) to achieve. The IAAO offers the following guidelines for the COD:

- Residential properties. CODs should be 10% or less in newer, homogeneous areas; 15% or less in older or heterogeneous areas; and 20% or less in rural, recreational, or seasonal areas. The standard of 15% could be applied to largely urban economic areas and 20% to the other economic areas covered in the present study.

- Commercial properties. CODs should be 15% or less in larger, urban areas and 20% or less in rural or depressed areas with less market activity.

- Vacant land. CODs should be 25% or less.

In addition to uniformity within property groups, it is important that each group be assessed at a similar percentage of market value. This aspect of assessment uniformity is termed horizontal equity. One can evaluate horizontal equity by comparing medians among property groups. A final aspect of assessment uniformity, known as vertical equity, relates to uniformity between low and high value properties. Ideally, of course, both should be assessed at a similar percentage of market value.

A long-standing measure of vertical equity is the price-related differential (PRD), which is the mean assessment ratio divided by the weighted mean assessment ratio:

$$\text{PRD} = \text{mean} \div \text{weighted mean}$$

When high value properties are under-assessed relative to other properties, the weighted mean falls below the mean and the PRD climbs above 1.00, signaling "assessment regressivity". When high value properties are relatively over-assessed, the weighted mean exceeds the mean and the PRD falls below 1.00, signaling "assessment progressivity". Because the mean and weighted mean are both affected by outliers and because the weighted mean is highly sensitive to ratios for the highest value properties, the PRD provides only a crude, inadequate gauge of price-related bias. In addition, the PRD lacks intuitive appeal as one can only say that PRDs near 1.00 are preferred to PRDs farther from 1.00.

We report a superior measure of vertical equity that is obtained by regressing percentage differences from the median assessment ratio on percentage differences from the median value[2]. The regression coefficient quantifies the relationship (if any) between property values and assessment levels. For example, a coefficient of -0.05 indicates that a doubling of values (an increase of 100%) is associated with a 5% decline in assessment level. Regression analysis also quantifies the statistical strength or significance of the relationship. If no price-related bias (PRB) is present, the coefficient from the regression will not be significantly different from zero. We suggest that price-related bias should be noted when (a) the regression coefficient is less than -0.03 or greater than 0.03 and (b) the relationship is statistically significant at the 95% confidence level. Regression coefficients below -0.05 should be viewed with concern, again assuming they are significant at the 95% confidence level.

[2] The dependent variable in the analysis is (Sale Ratio – Median Ratio)/Median Ratio. The independent variable is: Ln(Property Value/Median Value)/0.693. The use of logarithms converts the analysis to percentages and division by 0.693 (the natural logarithm of 2) permits each doubling of value to be associated with an increment of 1 (i.e. transforms the logs from natural logs to base 2 logs). Thus, for example, a coefficient of -0.024 means that the assessment level falls by 2.4% whenever value doubles (and increases by 2.4% whenever values are halved). For technical reasons, value is computed as ½ of time-adjusted sale price plus ½ of assessed value to avoid statistical bias that would overstate the degree of regressivity (or understate the degree of progressivity).

3. Improved Residential Analyses

3.1 Residential Price Trends

Sales from 2007 through June 2010 were analyzed to develop price trends used to adjust sales prices to the target date of July 1, 2010. Results varied by geographic area. For each of the state's nine economic regions, Exhibit 3-1 below summarizes average value changes over the full 42 months (Jan 07 to 1 July 10), for the 18 months preceding the revaluation (Jan 07 – June 08), and for the two years following it (June 08 – 1 July 10)[3]. Notice that over the two years following the revaluation values increased slightly in four areas, with the largest increase being 4.9% in area 82, and declined in the other five. In three areas the declines exceeded 8%. Easily the largest declines occurred in area 85, where prices depreciated by over 20%.

When sales from all areas of the state are pooled, the trend works out to be 2.3% over the full 42 month period and -1.5% over the final 24 months. Although not shown in the table, statewide, values increased an average of 5% in the first 7 months of 2007, then declined slightly through the third quarter of 2008, after which they were flat. The average property owner in the State has thus seen a modest decline of -2% to -3% since the market peaked in the summer of 2007. As can be seen in Exhibit 3-1, however, trends sometimes varied considerably among economic areas.

Exhibit 3-1
Average Value Change by Economic Area: Residential Property

Economic Area	42 Months (1/07 – 6/10)	18 Months (1/07 – 6/08)	24 Months (7/07 – 6/10)
81 Flathead and Lake Counties	-0.106	-0.019	-0.089
82 Cascade County and North Central Montana	0.100	0.049	0.049
84 Missoula and Ravalli Counties	-0.041	0	-0.041
85 Gallatin, Beaverhead, Madison, Park Counties	-0.224	0	-0.224
87 Eastern Montana	0.101	0.075	.024
88 Yellowstone County and South Central Montana	.049	.043	.006
89 Lewis & Clark, Jefferson & Broadwater Counties	0.014	0.039	-0.024
90 Silver Bow, Powell, Deerlodge, Granite Counties	.163	.154	.008
91 Sanders, Mineral, and Lincoln Counties	-0.135	0	-0.135
Statewide (all areas)	.023	.039	-.015

Exhibit 3-2 shows similar results for all 66 market areas. Values fell in 34 of the 66 market areas and were down by 10% or more in the 20 highlighted market areas (30%). Values increased moderately in 24 market areas (36%), including all seven market areas in economic area 82, and were unchanged in eight. Appendix 1 shows specific time periods studied, rates of change, number of sales, and statistical significance for each area.

[3] Because they are compounding, percentage changes for the 18 and 24 months periods generally will not sum to the total change for the full 42 months (unless the change for one of the periods is 0). If compounded, however, the trends are consistent (aside from rounding all trends to three decimal places). For area 81, for example, .981 x .911 = .894, implying a net decline of -.106 over the full 42 months.

Exhibit 3-2
Average Value Change by Market Area

Econ Area	Market Area	Sales Used	Pct Change 01/07 - 06/10	Pct Change 01/07 - 06/08	Pct Change 07/08 - 06/10
81	Flathead and Lake Counties	3104	-0.106	-0.019	-0.089
81	07-01 Flathead County - Kalispell	1062	-0.100	0.012	-0.111
81	07-02 Flathead County - South Valley	180	-0.119	0.000	-0.119
81	07-03 Flathead County - Condos	704	-0.173	0.000	-0.173
81	07-04 Flathead County, Columbia Falls Rural	419	-0.119	0.000	-0.119
81	07-05 Flathead County - Whitefish	345	-0.086	-0.044	-0.044
81	15-01 Lake County	531	-0.106	-0.039	-0.070
82	North Central Montana	4801	0.101	0.049	0.049
82	02-01 Cascade County - Great Falls	2671	0.068	0.043	0.024
82	02-02 Cascade County - Rural	428	0.088	0.037	0.049
82	02-03 Cascade County - Condos	241	0.068	0.043	0.024
82	08-05 Fergus County - Lewistown	337	0.055	0.000	0.055
82	12-04 Hill County - Havre	146	0.154	0.114	0.037
82	MJ-01 Other Primary Towns	629	0.075	0.055	0.018
82	MJ-02 Other Rural	186	0.127	0.094	0.030
84	Missoula and Ravalli Counties	5053	-0.041	0.000	-0.041
84	04-01 Missoula County - Missoula	1032	0.000	0.000	0.000
84	04-02 Missoula County - Suburban South	1112	-0.081	-0.018	-0.064
84	04-03 Missoula County - Northeast	250	-0.021	0.000	-0.021
84	04-04 Missoula County - West	158	-0.103	0.000	-0.103
84	04-06 Missoula County - Condos	522	-0.030	0.018	-0.047
84	04-07 Missoula County - Suburban North	836	0.000	0.018	-0.018
84	13-05 Ravalli County - Rural	659	-0.119	-0.035	-0.086
84	13-06 Ravalli County - Small Towns	119	0.000	0.000	0.000
84	13-09 Ravalli County - Hamilton	166	-0.137	-0.035	-0.105
85	Gallatin, Beaverhead, Madison, Park Counties	4657	-0.224	0.000	-0.224
85	06-03 Gallatin County - Bozeman	710	-0.219	0.000	-0.219
85	06-04 Gallatin County - Belgrade Rural	569	-0.246	0.000	-0.246
85	06-10 Gallatin Condos Excluding Big Sky	1003	-0.247	0.000	-0.247
85	06-11 Gallatin County - Bozeman Older	206	-0.175	0.000	-0.175
85	06-12 Big Sky Canyon Condos	123	-0.423	0.000	-0.423
85	06-13 Gallatin County - Suburban Bozeman	383	-0.175	0.000	-0.175
85	18-07 Beaverhead County - Dillon	237	0.000	0.000	0.000
85	25-06 Madison County - Condos	196	-0.321	0.000	-0.321
85	49-08 Park County - Livingston	377	-0.175	0.000	-0.175
85	MJ-09 Park & Gallatin Small Town/Town Rural	223	-0.214	0.000	-0.214
85	MJ-10 Gallatin/Madison - Spanish Peaks/Big Sky	122	-0.411	-0.103	-0.344
85	MJ-11 Gallatin and Madison - Small Towns	167	-0.162	0.075	-0.220
85	MJ-12 Recreational Areas	179	-0.134	-0.103	-0.035
85	MJ-13 Beaverhead & Madison Counties - Rural	98	0.000	0.000	0.000

Econ Area	Market Area	Sales Used	Pct Change 01/07 - 06/10	Pct Change 01/07 - 06/08	Pct Change 07/08 - 06/10
87	Eastern Montana	1969	0.101	0.075	0.024
87	14-01 Custer County - North Miles City	151	0.000	0.000	0.000
87	14-02 Custer County - South Miles City	272	0.101	0.075	0.024
87	16-01 Dawson County	208	0.074	0.114	-0.036
87	20-01 Valley County	183	0.101	0.075	0.024
87	20-02 Valley County - Saint Marie	28	0.000	0.000	0.000
87	22-01 Big Horn County	127	0.062	0.055	0.006
87	27-01 Richland County	236	0.182	0.134	0.043
87	29-01 Rosebud County	155	0.161	0.094	0.062
87	MJ-03 Phillips, Roosevelt, Daniels, Sheridan Co	390	0.127	0.075	0.049
87	MJ-04 Treasure, McCone, Prairie, Garfield, Wibaux, Petroleum, Carter Counties	120	0.233	0.134	0.087
87	MJ-15 Powder River and Fallon Counties	185	0.161	0.094	0.062
88	Yellowstone County and South Central Montana	7616	0.049	0.043	0.006
88	03-01 Yellowstone County - Rural & Small Town	320	0.043	0.018	0.024
88	03-02 Yellowstone County - Billings Heights/Lockwood/Downtown	1813	0.068	0.043	0.024
88	03-03 Yellowstone Co - Laurel/West Billings	718	0.081	0.062	0.018
88	03-04 Yellowstone Co - Northwest Billings	1196	0.037	0.018	0.018
88	03-05 Yellowstone County - Condos	958	0.037	0.037	0.000
88	03-06 Yellowstone Co - Central and West Billings	1342	0.081	0.062	0.018
88	10-01 Carbon County	345	0.074	0.074	0.000
88	MJ-14 Musselshell, Meagher, Golden Valley, Wheatland Counties	245	0.074	0.037	0.037
88	MJ-16 Stillwater and Sweet Grass Counties	391	0.012	0.068	-0.053
89	Lewis & Clark, Jefferson & Broadwater Counties	2722	0.014	0.039	-0.024
89	05-01 Lewis and Clark County - Helena	778	0.007	0.031	-0.024
89	05-05 Lewis and Clark County - Condos	272	0.074	0.062	0.012
89	MJ-07 Jefferson - Clancy, Lewis & Clark Rural	1191	0.016	0.031	-0.015
89	MJ-08 Broadwater, Jefferson - Rural and Lewis & Clark - Augusta	299	-0.041	-0.018	-0.024
90	Silver Bow, Powell, Deerlodge, Granite Countie	1904	0.163	0.154	0.008
90	01-01 Silver Bow County - Butte	1202	0.120	0.114	0.006
90	MJ-05 Silver Bow, Powell, Deerlodge, Granite County - Rural	238	-0.106	0.114	-0.197
90	MJ-06 Powell and Deerlodge Counties - Towns	310	0.099	0.094	0.005
91	Sanders, Mineral, and Lincoln Counties	611	-0.135	0.000	-0.135
91	35-01 Sanders County	204	-0.173	0.000	-0.173
91	54-01 Mineral County	77	0.000	0.000	0.000
91	56-01 Lincoln County	356	-0.156	0.000	-0.156

3.2 Residential Outlier Analysis

Sales with extreme prices (especially very low prices) were eliminated, as well as any properties with a total assessed value of less than 50% of the minimum price. For example, if the minimum sale price retained for analysis was $20,000, the minimum accepted assessed value was $10,000. Minimum prices ranged from $10,000 in area 87 (Eastern Montana) to $50,000 in areas 81 (Flathead and Lake county) and 84 (Missoula and Ravalli county). In all, only 199 of 34,432 sales (less than 0.5%) were eliminated based on price or assessed value.

Properties with very low or high ratios were also eliminated. Ratio trim points for improved residential properties were generally set to eliminate extreme ratios (ratios beyond 3 IQRs of the nearest quartile, as described above in section 2.3). These cut points were further adjusted to conform to reasonable break points in the data. Exhibit 3-3 summarizes the percentage of ratios eliminated as outliers in each economic area. In all, 553 ratios (1.7%) were eliminated as outliers.

Exhibit 3-3
Residential Ratios Eliminated as Outliers

Region	81	82	84	85	87	88	89	90	91
Percent	1.3	1.5	0.7	2.7	6.4	0.4	1.2	2.7	1.6

3.3 Residential Sales Ratio Analysis

Exhibit 3-4 below summarizes overall ratio study results for improved residential properties statewide. The overall median is 1.004, up slightly from 0.982 noted in our April 2009 report based on January 2007 to September 2009 sales. The COD is 14.1%, up from 10.1 in our prior study, which indicates that inequity of appraisal to market value statewide is 40% higher at this point in time compared to our prior report. The deterioration in the COD is due primarily to uneven price level changes and less stability in more recent sales[4].

Exhibit 3-4
Statewide Residential Ratio Statistics

Number of Sales	33,680
Median	1.004
Lower 95% Conf Limit	1.002
Upper 95% Conf Limit	1.006
Weighted Mean	1.037
Lower 95% Conf Limit	1.034
Upper 95% Conf Limit	1.041
Minimum Ratio	.407
Maximum Ratio	2.066
COD	.141
Price-Related Bias	.031
PRB Significance	.000

[4] Both studies employed the same methodology and excluded 1.7% of ratio outliers.

Exhibit 3-5 below contains sales ratio study results by economic and market area. Importantly, the median shows the typical ratio of assessed value to market value as of July 1, 2010 in each market area. In the 18 highlighted market areas and two economic areas (81 and 85) one can conclude, with 95% confidence, that the assessment level exceeds 110% of market value. Economic area 91 also has a median ratio slightly in excess of 1.10; although the lower 95% confidence limit of 1.085 indicates that one cannot conclude that the median appraisal level of all residential property in the area (both sold and unsold) is above 1.10. Not surprisingly, these three economic areas are the same areas highlighted earlier in which property values had depreciated most since the reassessment date. In fact, an examination of Exhibit 3-2 will show that virtually all the market decline in these areas occurred subsequent to the reappraisal. In area 85 the overall median ratio now stands at 1.255 with eight of 14 market areas above 1.20.

By contrast, the overall median assessment level is between 0.90 and 1.00 in five of the nine economic areas and between 1.00 and 1.10 in the one remaining area. Differences among the nine economic areas are, of course, largely attributable to differences in price trends since June 2008. A closer inspection of Exhibit 3.5 also reveals that median ratios sometimes differ markedly among market areas within the same economic area. In area 85, for example, while the overall median ratio is 1.255, three market areas have median ratios below 1.00. In area 87 the median ratio for market area MJ-04 stands at 0.795 due to healthy appreciation in property values through June 2009 (see Appendix 1).

Once again, while assessment levels were consistently near 1.00 after the reassessment, differences in price trends among different areas of the state have resulted in some significant disparities in assessment levels. Such disparities across an entire state two years following a reappraisal are typical and can be addressed by partial updates to the valuation models or through the application of market adjustment factors targeted to bring assessment levels back into alignment.

Assessment uniformity within areas as measured by the COD and coefficient of price-related bias (PRB) are generally good. Areas with CODs above 20% or PRB measures below -.05 (indicating assessment regressivity) that are statistically significant at the 95% confidence level are highlighted in Exhibit 3-5.

Exhibit 3-5
Residential Ratio Statistics by Market Area

Region	Market Area	Sales	Median	Lower Bound	Upper Bound	Wtd Mean	Lower Bound	Upper Bound	Min	Max	COD	PRB Coef.	PRB Sig.
81	07-01 Flathead County - Kalispell	1106	1.131	1.125	1.136	1.116	1.107	1.126	.629	1.648	.077	-.040	.000
	07-02 Flathead County - South Valley	176	1.146	1.120	1.168	1.148	1.111	1.184	.681	1.624	.094	.003	.813
	07-03 Flathead County - Condos	628	1.203	1.196	1.210	1.180	1.165	1.195	.706	1.615	.073	-.006	.221
	07-04 Flathead County, Columbia Falls Rural	433	1.142	1.131	1.156	1.124	1.106	1.142	.559	1.631	.087	-.051	.000
	07-05 Flathead County - Whitefish	381	1.024	1.003	1.043	.984	.960	1.007	.565	1.607	.116	-.026	.003
	15-01 Lake County	571	1.062	1.050	1.075	1.033	1.009	1.056	.552	1.647	.128	-.014	.112
	Overall	3295	1.128	1.124	1.134	1.092	1.083	1.101	.552	1.648	.100	-.030	.000
82	02-01 Cascade County - Great Falls	2743	.972	.969	.975	.975	.971	.978	.571	1.654	.066	-.019	.000
	02-02 Cascade County - Rural	481	.951	.937	.963	.930	.915	.944	.459	1.568	.121	-.010	.270
	02-03 Cascade County - Condos	286	.958	.948	.966	.950	.941	.958	.648	1.290	.055	.009	.182
	08-05 Fergus County - Lewistown	401	.979	.962	.996	.972	.954	.991	.574	1.723	.118	-.013	.221
	12-04 Hill County - Havre	169	.920	.898	.941	.921	.900	.943	.556	1.809	.137	-.077	.001
	MJ-01 Primary Towns in Choteau, Toole, Blaine, Pondera, Teton, Judith Basin, Glacier, Liberty Co.	676	.940	.927	.954	.922	.909	.935	.536	1.488	.143	-.056	.000
	MJ-02 Rural Choteau, Toole, Blaine, Pondera, Teton, Judith Basin, Glacier, Liberty County	214	.907	.862	.937	.809	.767	.850	.424	1.425	.187	-.075	.000
	Overall	4970	.965	.962	.967	.955	.951	.959	.424	1.809	.093	-.015	.000
84	04-01 Missoula County - Missoula	1140	.994	.988	1.000	.987	.978	.995	.620	1.623	.097	-.041	.000
	04-02 Missoula County - Suburban Missoula South	1139	1.078	1.072	1.083	1.074	1.064	1.083	.683	1.660	.081	-.015	.046
	04-03 Missoula County - Northeast	275	1.017	1.007	1.024	.996	.977	1.015	.637	1.470	.079	-.014	.208
	04-04 Missoula County - West	173	1.082	1.065	1.104	1.089	1.064	1.113	.652	1.549	.104	-.039	.194
	04-06 Missoula County - Condos	563	1.037	1.029	1.044	1.016	1.006	1.026	.694	1.358	.073	-.014	.149
	04-07 Missoula County - Suburban Missoula North	877	1.005	1.001	1.009	.993	.984	1.002	.594	1.429	.057	-.010	.047
	13-05 Ravalli County - Rural	692	1.070	1.060	1.085	1.028	1.011	1.044	.555	1.652	.116	-.078	.000
	13-06 Ravalli County - Small Towns	128	1.001	.980	1.027	1.006	.980	1.031	.684	1.613	.107	.056	.077
	13-09 Ravalli County - Hamilton	183	1.159	1.140	1.189	1.149	1.126	1.172	.671	1.695	.093	-.014	.620
	Overall	5170	1.033	1.029	1.036	1.025	1.021	1.030	.555	1.695	.094	-.014	.000

Region	Market Area	Sales	Median	Lower Bound	Upper Bound	Wtd Mean	Lower Bound	Upper Bound	Min	Max	COD	PRB Coef.	PRB Sig.
85	06-03 Gallatin County - Bozeman	743	1.259	1.250	1.266	1.248	1.236	1.260	.638	1.656	.075	-.032	.000
	06-04 Gallatin County - Belgrade Rural	595	1.292	1.284	1.300	1.270	1.252	1.289	.617	1.692	.077	-.066	.000
	06-10 Gallatin County Condos Excluding Big Sky	1049	1.320	1.314	1.325	1.297	1.285	1.309	.660	1.799	.079	-.011	.129
	06-11 Gallatin County - Bozeman Older	230	1.232	1.213	1.255	1.190	1.154	1.225	.597	1.891	.127	-.167	.000
	06-12 Big Sky Canyon Condos	123	1.517	1.496	1.575	1.449	1.392	1.506	.904	1.838	.107	-.030	.088
	06-13 Gallatin County - Suburban Bozeman	407	1.173	1.162	1.189	1.163	1.140	1.187	.699	1.897	.110	-.038	.004
	18-07 Beaverhead County - Dillon	246	.975	.951	1.002	.987	.966	1.008	.615	1.645	.130	.003	.877
	25-06 Madison County - Condos	197	1.464	1.427	1.476	1.400	1.354	1.446	.722	2.054	.136	-.027	.002
	49-08 Park County - Livingston	381	1.151	1.135	1.169	1.127	1.110	1.145	.636	1.688	.116	-.043	.029
	MJ-09 Park and Gallatin County Small Town/ Rural	227	1.150	1.101	1.186	1.045	.999	1.091	.510	1.658	.175	-.034	.091
	MJ-10 Gallatin/Madison - Spanish Peaks/Big Sky	117	1.482	1.432	1.528	1.420	1.358	1.483	.795	2.066	.137	-.024	.069
	MJ-11 Gallatin and Madison Counties - Small Town	173	1.223	1.202	1.250	1.224	1.196	1.252	.627	1.698	.123	-.003	.889
	MJ-12 Gallatin, Beaverhead, Madison and Park Recreational	176	.948	.882	1.027	.928	.882	.974	.451	1.695	.226	.014	.652
	MJ-13 Beaverhead and Madison County - Rural	114	.918	.877	.941	.846	.803	.890	.413	1.417	.187	-.019	.479
	Overall	4778	1.255	1.249	1.261	1.239	1.227	1.251	.413	2.066	.132	-.026	.000
87	14-01 Custer County - North Miles City	158	.974	.948	1.003	.960	.934	.987	.503	1.539	.140	-.073	.001
	14-02 Custer County - South Miles City	296	.933	.915	.952	.923	.902	.944	.513	1.535	.137	-.042	.002
	16-01 Dawson County	218	.935	.915	.963	.934	.911	.957	.501	1.505	.148	-.015	.346
	20-01 Valley County	215	.887	.862	.925	.837	.805	.870	.475	1.498	.187	-.060	.001
	20-02 Valley County - Saint Marie	19	.800	.631	.953	.791	.698	.883	.487	1.517	.238	-.104	.581
	22-01 Big Horn County	140	.939	.905	.975	.902	.875	.929	.484	1.423	.137	-.118	.000
	27-01 Richland County	247	.887	.860	.909	.884	.862	.905	.520	1.490	.159	-.021	.168
	29-01 Rosebud County	172	.890	.870	.916	.883	.859	.906	.520	1.537	.136	-.016	.406
	MJ-03 Phillips, Roosevelt, Daniels and Sheridan Counties	374	.955	.927	.988	.917	.890	.944	.502	1.737	.216	-.107	.000
	MJ-04 Treasure, McCone, Prairie, Garfield, Wibaux, Petroleum, and Carter Counties	130	.795	.748	.831	.773	.738	.808	.407	1.359	.191	-.042	.082
	MJ-15 Powder River and Fallon Counties	194	.883	.848	.919	.871	.844	.898	.558	1.510	.153	-.074	.000
	Overall	2163	.916	.908	.923	.897	.888	.905	.407	1.737	.169	-.038	.000
88	03-01 Yellowstone County - Rural & Small Towns	352	.946	.935	.957	.928	.914	.942	.523	1.408	.101	-.035	.016
	03-02 Yellowstone County - Billings Heights/ Lockwood/Downtown	1898	.950	.946	.954	.951	.947	.956	.553	1.494	.072	.016	.002
	03-03 Yellowstone County - Laurel/West Billings	758	.954	.945	.962	.955	.946	.965	.653	1.490	.086	-.005	.466
	03-04 Yellowstone County - Northwest Billings	1256	.975	.970	.979	.968	.962	.974	.567	1.526	.073	-.012	.024
	03-05 Yellowstone County - Condos	1029	.989	.985	.993	.998	.992	1.005	.649	1.531	.069	.036	.000
	03-06 Yellowstone County - Central and West Billings	1415	.960	.955	.966	.961	.956	.966	.524	1.555	.066	-.061	.000
	10-01 Carbon County	389	.971	.955	.991	.966	.949	.983	.500	1.440	.115	-.011	.245
	MJ-14 Musselshell, Meagher, Golden Valley and Wheatland Counties	254	.917	.898	.936	.897	.873	.921	.512	1.585	.168	-.052	.001
	MJ-16 Stillwater and Sweet Grass Counties	422	.991	.981	1.000	.968	.955	.981	.547	1.443	.086	-.038	.000
	Overall	7773	.965	.963	.967	.962	.959	.964	.500	1.585	.081	-.005	.020

Region	Market Area	Sales	Median	Lower Bound	Upper Bound	Wtd Mean	Lower Bound	Upper Bound	Min	Max	COD	PRB Coef.	PRB Sig.
89	05-01 Lewis and Clark County - Helena	932	.974	.965	.983	.962	.953	.971	.542	1.597	.107	-.048	.000
	05-05 Lewis and Clark County - Condos	306	.966	.954	.981	.960	.945	.975	.569	1.470	.101	.023	.096
	MJ-07 Jefferson - Clancy and Lewis & Clark Rural	1347	.934	.928	.943	.923	.914	.932	.524	1.614	.121	-.013	.134
	MJ-08 Broadwater, Jefferson - Rural and Lewis & Clark - Augusta	339	.929	.900	.950	.900	.871	.929	.411	1.636	.178	.003	.843
	Overall	2924	.952	.946	.959	.936	.930	.942	.411	1.636	.122	-.011	.032
90	01-01 Silver Bow County - Butte	1365	.916	.903	.928	.902	.892	.913	.426	1.972	.193	-.102	.000
	MJ-05 Silver Bow, Powell, Deerlodge and Granite County - Rural	257	1.048	1.025	1.085	1.004	.965	1.043	.443	1.963	.218	-.100	.000
	MJ-06 Powell and Deerlodge Counties - Towns	325	.951	.922	.987	.918	.889	.947	.417	1.941	.211	-.110	.000
	Overall	1947	.933	.923	.946	.924	.913	.935	.417	1.972	.205	-.074	.000
91	35-01 Sanders County	1365	1.134	1.098	1.162	1.113	1.080	1.146	.540	1.784	.155	.039	.028
	54-01 Mineral County	257	.957	.933	1.005	.941	.899	.983	.543	1.413	.136	-.017	.568
	56-01 Lincoln County	325	1.125	1.105	1.147	1.057	1.030	1.084	.569	1.765	.133	-.038	.002
	Overall	1947	1.106	1.085	1.123	1.058	1.039	1.078	.540	1.784	.148	-.012	.287

4. Commercial Analyses

4.1 Commercial Price Trends

The methodology used to develop price trends for commercial property was similar to that for residential property, although in order to obtain adequate sales the analyses were conducted at the economic area level. Trends for apartments and other commercial properties followed the same pattern and were combined in the final analysis. As with residential property, all sales were adjusted to July 1, 2010.

Exhibit 4-1 below summarizes average value changes over the full 42 months (Jan 07 to 1 July 10), for the 18 months prior to the revaluation, and for the two years following it by economic area. Value changes for commercial properties were generally less than for residential. Only in areas 85 and 91 did values fall by 10% or more since the revaluation. In four areas values appreciated modestly, led by a 6.2% increase in area 87. It might be noted, however, that only in area 87 did values increase after September 2008.

On a statewide basis, when sales from all areas are pooled, values increased 6.5% during the study period with all but 1% of the increase occurring before the reappraisal. Again, however, it should be emphasized that trends differ among economic areas.

Exhibit 4-1
Average Value Change by Economic Area: Commercial Property

Economic Area	42 Months (1/07 – 6/10)	18 Months (1/07 – 6/08)	24 Months (7/07 – 6/10)
81 Flathead and Lake Counties	0	0	0
82 Cascade County and North Central Montana	.087	.075	.012
84 Missoula and Ravalli Counties	0	0	0
85 Gallatin, Beaverhead, Madison, Park Counties	-.119	0	-.119
87 Eastern Montana	.161	.094	.062
88 Yellowstone County and South Central Montana	.174	.24	-.053
89 Lewis & Clark, Jefferson & Broadwater Counties	0	.055	-.053
90 Silver Bow, Powell, Deerlodge, Granite Counties	.232	.196	.030
91 Sanders, Mineral, and Lincoln Counties	-.100	0	-.100
Statewide (all areas)	.065	.055	.010

Appendix 2 shows specific time periods studied, rates of change, number of sales, and statistical significance for each area. The general pattern statewide was for values to increase moderately at an average rate of 0.3% per month from January 2007 to September 2008 and then to either stabilize or decline.

4.2 Commercial Outlier Analysis

Very low and a few very high time-adjusted sales prices, as well as any properties with a total assessed value of less than 50% of the minimum retained price, were removed. An analysis of ratio outliers was also conducted. Ratios more than 3 IQR (inter-quartile range) were identified and further scrutinized so as to set cut point at logical breaks. Exhibit 4-2 below shows the number and percentage of sales removed as ratio outliers in each economic area.

Exhibit 4-2
Commercial Ratios Eliminated as Outliers

Region	81	82	84	85	87	88	89	90	91
Number	9	14	3	9	14	8	12	10	6
Percent	4.5	3.7	1.0	3.2	7.0	1.9	9.8	6.5	10.7

In all, 85 sales (4.1%) were removed as outlier ratios.

4.3 Commercial Sales Ratio Analysis

Exhibit 4-3 below shows statewide commercial sales ratio statistics. The median ratio of 0.960 indicates that values remain closely centered on market values and well within IAAO's established range of 0.90 to 1.10. The COD is reasonable for commercial properties and the coefficient of price-related bias indicates consistency in the appraisal of relatively low and high value properties.

Exhibit 4-3
Statewide Residential Ratio Statistics

Number of Sales	2,024
Median	0.960
Lower 95% Conf Limit	0.960
Upper 95% Conf Limit	0.960
Weighted Mean	0.939
Lower 95% Conf Limit	0.938
Upper 95% Conf Limit	0.939
Minimum Ratio	.394
Maximum Ratio	1.962
COD	.213
Price-Related Bias	-.007
PRB Significance	.153

Exhibit 4-4 shows results by commercial property type. The median ratios are all between 0.92 and 1.02 and CODs range from .146 for apartments to .240 for retail properties. The coefficients of price-related bias again indicate consistency in the appraisal of lower and higher value properties.

Exhibit 4-4
Commercial Ratio Statistics by Property Type

	Apartment	Office	Retail	Ware-house	Other
Number of Sales	386	343	794	396	105
Median	0.971	0.979	0.958	0.920	1.019
Lower 95% Conf Limit	0.971	0.978	0.958	0.920	1.019
Upper 95% Conf Limit	0.971	0.979	0.958	0.920	1.200
Weighted Mean	0.975	0.952	0.925	0.888	0.992
Lower 95% Conf Limit	0.975	0.951	0.924	0.888	0.991
Upper 95% Conf Limit	0.975	0.952	0.925	0.888	0.992
Minimum Ratio	0.501	0.402	0.394	0.466	0.439
Maximum Ratio	1.753	1.954	1.962	1.958	1.681
COD	0.146	0.222	0.240	0.215	0.198
Price-Related Bias	0.017	0.014	-0.019	-0.023	-0.007
PRB Significance	0.095	0.226	0.020	0.029	0.686

Exhibit 4-5 shows sales ratio results by economic area. Median ratios range from 0.830 in area 90, where property values appreciated substantially, to 1.113 in area 91, where values declined by 10% following the reappraisal (see Exhibit 4-1 above). CODs range from .141 in area 81 (Flathead and Lake counties) to .309 in sparsely populated area 87 (Eastern Montana), where property values are lowest and market information least plentiful. The coefficient of price-related bias in area 91 indicates probable regressivity.

Appendix 3 contains commercial sales ratios by property type within economic area. Caution should be exercised in evaluating property groups with small samples. In general, samples of 30 or more are associated with high reliability and samples of less than 15 with low reliability. Confidence limits can be used to evaluate the reliability of median ratios. The PRB significance level indicates the reliability of the PRB statistic (values under 0.05 denote at least 95% confidence). Ratio statistics associated with adequate sample size and 95% statistical reliability that indicate potential significant problem areas have been highlighted[5].

[5] A number of areas are also marginally out of compliance with IAAO standard for the median ratio (namely 0.90 to 1`.10), although the differences are less substantial or statistically significant.

Exhibit 4-5
Commercial Ratio Statistics by Economic Area

Region	81	82	84	85	87	88	89	90	91	Total
Number of Sales	189	366	283	273	185	422	111	145	50	2024
Median	0.971	0.979	0.975	1.031	0.989	0.916	0.969	0.830	1.113	0.960
Lower 95% Conf Limit	0.968	0.979	0.974	1.029	0.893	0.916	0.968	0.828	1.107	0.960
Upper 95% Conf Limit	0.971	0.979	0.976	1.037	0.915	0.917	0.975	0.831	1.118	0.960
Weighted Mean	0.936	0.947	0.949	1.024	0.891	0.905	0.955	0.788	1.003	0.939
Lower 95% Conf Limit	0.936	0.947	0.949	1.023	0.890	0.905	0.954	0.787	1.002	0.938
Upper 95% Conf Limit	0.936	0.947	0.949	1.024	0.891	0.906	0.955	0.788	1.003	0.939
Minimum Ratio	0.502	0.417	0.468	0.484	0.435	0.394	0.541	0.402	0.554	0.394
Maximum Ratio	1.682	1.942	1.912	1.954	1.958	1.962	1.466	1.435	1.572	1.962
COD	0.141	0.185	0.179	0.242	0.309	0.219	0.178	0.248	0.180	0.213
Price-Related Bias	-0.012	-0.027	-0.021	0.016	-0.026	0.000	0.030	-0.020	-0.076	-0.007
PRB Significance	0.355	0.009	0.090	0.270	0.335	0.971	0.100	0.322	0.065	0.153

Appendix 1: Residential Price Trend Analyses

Region	Market Area	Sales	Trend 1	Rate 1	t-value	Trend 2	Rate 2	t-value	Trend 3	Rate 3	t-value
State	**All Counties**	32902	01/07 - 07/07	0.007	11.2	08/07 - 9/08	-0.001	9.3	10/08 - 06/10	0	
81	**Flathead and Lake Counties**	3104	01/07 - 07/07	0.002	1.4	08/07 - 9/08	-0.003	5.7	10/08 - 06/10	-0.004	9.5
81	07-01 Flathead County - Kalispell	1062	01/07 - 07/07	0.008	4.1	08/07 - 9/08	-0.004	5.8	10/08 - 06/10	-0.005	6.9
81	07-02 Flathead County - South Valley	180	01/07 - 07/07	0		08/07 - 9/08	0		10/08 - 06/10	-0.006	3.5
81	07-03 Flathead County - Condos	704	01/07 - 09/08	0		10/08 - 06/10	-0.009	15.7			
81	07-04 Flathead County, Columbia Falls Rural	419	01/07 - 09/08	0		10/08 - 06/10	-0.006	5.5			
81	07-05 Flathead County - Whitefish	345	01/07 - 09/07	0		10/07 - 03/09	-0.005	5.8	04/09 - 06/10	0	
81	15-01 Lake County	531	01/07 - 08/07	0		09/07 - 12/09	-0.004	6.6	01/10 - 06/10	0	
82	**North Central Montana**	4801	01/07 - 12/07	0.003	5.1	01/08 - 06/10	0.002	9.0			
82	02-01 Cascade County - Great Falls	2671	01/07 - 12/07	0.003	5.6	01/08 - 06/10	0.001	7.6			
82	02-02 Cascade County - Rural	428	01/07 - 06/10	0.002	4.8						
82	02-03 Cascade County - Condos	241	01/07 - 12/07	0.003	2.8	01/08 - 06/10	0.001	1.8			
82	08-05 Fergus County - Lewistown	337	01/07 - 06/08	0.003	2.7	07/08 - 06/10	0				
82	12-04 Hill County - Havre	146	01/07 - 12/08	0.006	4.0						
82	MJ-01 Other Primary Towns	629	01/07 - 12/08	0.003	4.1	01/09 - 06/10	0				
82	MJ-02 Other Rural	186	01/07 - 12/08	0.005	3.1	01/09 - 06/11	0				
84	**Missoula and Ravalli Counties**	5053	01/07 - 09/08	0		10/08 - 06/10	-0.002	10.2			
84	04-01 Missoula County - Missoula	1032	01/07 - 09/08	0		10/08 - 06/10	0				
84	04-02 Missoula County - Suburban South	1112	01/07 - 09/08	-0.001	2.6	10/08 - 06/10	-0.003	4.6			
84	04-03 Missoula County - Northeast	250	01/07 - 09/08	0		10/08 - 06/10	-0.001	1.7			
84	04-04 Missoula County - West	158	01/07 - 12/08	0		01/09 - 06/10	-0.006	3.7			
84	04-06 Missoula County - Condos	522	01/07 - 12/08	0.001	2.5	01/09 - 06/10	-0.003	3.3			
84	04-07 Missoula County - Suburban North	836	01/07 - 09/08	0.001	2.8	10/08 - 06/10	-0.001	3.2			
84	13-05 Ravalli County - Rural	659	01/07 - 09/08	-0.002	1.8	10/08 - 06/10	-0.004	4.1			

Region	Market Area	Sales	Trend 1	Rate 1	t-value	Trend 2	Rate 2	t-value	Trend 3	Rate 3	t-value
85	**Gallatin, Beaverhead, Madison, Park Counties**	4657	01/07 - 6/08	-0.002	-3.5	07/08 - 06/10	-0.009	-25.1			
85	06-03 Gallatin County - Bozeman	710	01/07 - 6/08	-0.003	-4.3	07/08 - 06/10	-0.008	-16.6			
85	06-04 Gallatin County - Belgrade Rural	569	01/07 - 6/08	-0.005	-6.8	07/08 - 06/10	-0.008	-12.9			
85	06-10 Gallatin Condos Excluding Big Sky	1003	01/07 - 6/08	-0.001	-1.7	07/08 - 06/10	-0.011	-20.4			
85	06-11 Gallatin County - Bozeman Older	206	01/07 - 6/08	0		07/08 - 06/10	-0.008	-7.2			
85	06-12 Big Sky Canyon Condos	123	01/07 - 6/08	-0.009	-3.2	07/08 - 06/10	-0.016	-8.1			
85	06-13 Gallatin County - Suburban Bozeman	383	01/07 - 6/08	-0.004	-3.3	07/08 - 06/10	-0.005	-4.7			
85	18-07 Beaverhead County - Dillon	237	01/07 - 6/08	0		07/08 - 06/10	0				
85	25-06 Madison County - Condos	196	01/07 - 6/08	0		07/08 - 06/10	-0.016	-8.5			
85	49-08 Park County - Livingston	377	01/07 - 6/08	0		07/08 - 06/10	-0.008	-8.1			
85	MJ-09 Park & Gallatin Small Town/Town Rural	223	01/07 - 6/08	0		07/08 - 06/10	-0.01	-4.8			
85	MJ-10 Gallatin/Madison - Spanish Peaks/Big Sky	122	01/07 - 09/08	-0.006	1.8	10/08 - 06/10	-0.019	5.7			
85	MJ-11 Gallatin and Madison - Small Towns	167	01/07 - 12/08	0.004	2.4	01/09 - 06/10	-0.015	-4.9			
85	MJ-12 Recreational Areas	179	01/07 - 12/08	-0.006	-2.1	01/09 - 06/10	0				
85	MJ-13 Beaverhead & Madison Counties - Rural	98	01/07 - 12/08	0		01/09 - 06/10	0				
87	**Eastern Montana**	1969	01/07 - 12/08	0.004	7.5	01/09 - 06/10	0				
87	14-01 Custer County - North Miles City	151	01/07 - 12/08	0		01/09 - 06/10	0				
87	14-02 Custer County - South Miles City	272	01/07 - 12/08	0.004	3.3	01/09 - 06/10	0				
87	16-01 Dawson County	208	01/07 - 12/08	0.006	3.3	01/09 - 06/10	-0.004	1.6			
87	20-01 Valley County	183	01/07 - 12/08	0.004	2.1	01/09 - 06/10	0				
87	20-02 Valley County - Saint Marie	28	01/07 - 12/08	0		01/09 - 06/10	0				
87	22-01 Big Horn County	127	01/07 - 08/08	0.003	1.7	09/08 - 06/10	0				
87	27-01 Richland County	236	01/07 - 12/08	0.007	5.0	01/09 - 06/10	0				
87	29-01 Rosebud County	155	01/07 - 06/09	0.005	3.4	07/09 - 06/10	0				
87	MJ-03 Phillips, Roosevelt, Daniels, Sheridan Co.	390	01/07 - 06/09	0.004	2.8	07/09 - 06/10	0				
87	MJ-04 Treasure, McCone, Prairie, Garfield, Wibaux, Petroleum, Carter Counties	120	01/07 - 06/09	0.007	3.8	07/09 - 06/10	0				
87	MJ-15 Powder River and Fallon Counties	185	01/07 - 06/09	0.005	3.5	07/09 - 06/10	0				
88	**Yellowstone County & South Central Montana**	7616	01/07 - 12/07	0.003	6.4	01/08 - 12/08	0.001	4.8	01/09 - 06/10	0	
88	03-01 Yellowstone County - Rural & Small Towns	320	01/07 - 06/10	0.001	2.4						
88	03-02 Yellowstone County - Billings Heights/Lockwood/Downtown	1813	01/07 - 12/07	0.003	3.5	01/08 - 12/08	0.001	2.0	01/09 - 06/10	0.001	2.1
88	03-03 Yellowstone Co - Laurel/West Billings	718	01/07 - 12/07	0.005	3.9	01/08 - 12/08	0		01/09 - 06/10	0.001	2.0
88	03-04 Yellowstone Co - Northwest Billings	1196	01/07 - 12/09	0.001	5.8	01/10 - 06/10	0				
88	03-05 Yellowstone County - Condos	958	01/07 - 12/07	0.003	3.8	01/08 - 12/08	0		01/09 - 06/10	0	
88	03-06 Yellowstone Co - Central and West Billings	1342	01/07 - 12/07	0.005	7.5	01/08 - 12/08	0		01/09 - 06/10	0.001	2.8
88	10-01 Carbon County	345	01/07 - 12/07	0.006	3.0	01/08 - 12/08	0		01/09 - 06/10	0	
88	MJ-14 Musselshell, Meagher, Golden Valley, Wheatland Counties	245	01/07 - 12/07	0		01/08 - 12/08	0.006	2.7	01/09 - 06/10	0	
88	MJ-16 Stillwater and Sweet Grass Counties	391	01/07 - 12/07	0.004	2.0	01/08 - 12/08	0.003	2.2	01/09 - 06/10	-0.004	2.2

Region	Market Area	Sales	Trend 1	Rate 1	t-value	Trend 2	Rate 2	t-value	Trend 3	Rate 3	t-value
89	**Lewis & Clark, Jefferson & Broadwater County**	2722	01/07 - 07/07	0.007	3.9	08/07 - 06/10	-0.001	2.5			
89	05-01 Lewis and Clark County - Helena	778	01/07 - 07/07	0.006	2.3	08/07 - 06/10	-0.001	2.9			
89	05-05 Lewis and Clark County - Condos	272	01/07 - 07/07	0.007	1.7	08/07 - 06/09	0.001	1.5	07/09 - 06/10	0	
89	MJ-07 Jefferson - Clancy, Lewis & Clark Rural	1191	01/07 - 07/07	0.006	2.3	08/07 - 09/09	-0.001	2.8	10/09 - 06/10	0	
89	MJ-08 Broadwater, Jefferson - Rural and Lewis & Clark - Augusta	299	01/07 - 09/07	0		10/07 - 06/09	-0.002	1.6	07/09 - 06/10	0	
90	**Silver Bow, Powell, Deerlodge, Granite County**	1904	01/07 - 07/08	0.008	8.8	08/08 - 06/09	0		07/09 - 06/10	0	
90	01-01 Silver Bow County - Butte	1202	01/07 - 07/08	0.006	7.6	08/08 - 06/09	0		07/09 - 06/10	0	
90	MJ-05 Silver Bow, Powell, Deerlodge, Granite County - Rural	238	01/07 - 06/09	0.006	3.3	07/09 - 06/10	-0.024	3.5			
90	MJ-06 Powell and Deerlodge Counties - Towns	310	01/07 - 07/08	0.005	2.6	08/08 - 06/10	0				
91	**Sanders, Mineral, and Lincoln County**	611	01/07 - 06/08	0		07/08 - 06/09	0		07/09 - 06/10	-0.012	5.1
91	35-01 Sanders County	204	01/07 - 09/08	0		10/08 - 06/10	-0.009	5.0			
91	54-01 Mineral County	77	01/07 - 06/08	0		07/08 - 06/09	0		07/09 - 06/10	0	
91	56-01 Lincoln County	356	01/07 - 06/08	0		07/08 - 06/09	0		07/09 - 06/10	-0.014	2.8

Appendix 2: Commercial Price Trend Analyses

Region	Counties	Sales	Trend 1	Rate 1	t-value	End 1	Trend 2	Rate 2	t-value	Trend 3	Rate 3	t-value
State	All counties	1915	01/07 - 09/08	0.003	4.1	21	10/08 - 06/20	0				
81	Flathead and Lake Counties	157	01/07 - 09/08	0		21	10/08 - 06/20	0				
82	Cascade County and North Central Montana	308	01/07 - 09/08	0.004	3.1	21	10/08 - 06/20	0				
84	Missoula and Ravalli Counties	270	01/07 - 09/08	0		21	10/08 - 06/10	0				
85	Gallatin, Beaverhead, Madison, Park Counties	247	01/07 - 09/08	0		21	10/08 - 06/10	-0.006				
87	Eastern Montana	169	01/07 - 06/09	0.005	2.9	30	07/09 - 06/10	0				
88	Yellowstone County and South Central Montana	389	01/07 - 09/08	0.012	5.7	21	10/08 - 06/09	-0.01	2.6	07/09 - 06/10	0	
89	Lewis & Clark, Jefferson & Broadwater Counties	95	01/07 - 09/08	0.003	1.2	21	10/08 - 06/10	-0.003	1.6			
90	Silver Bow, Powell, Deerlodge, Granite Counties	141	01/07 - 09/08	0.01	3.8	21	10/08 - 06/10	0				
91	Sanders, Mineral, and Lincoln Counties	47	01/07 - 09/08	0		21	10/08 - 06/10	-0.005	1.7			

Appendix 3
Commercial Ratio Statistics by Property Type and Region

AREA	Property Type	Sales	Median	Median Conf Interval		Wtd Mean	Min	Max	COD	Price-Related Bias	
				Lower 95%	Upper 95%					PRB Coef.	PRB Sig.
81	1 Apartment	27	.971	.971	.974	.977	.766	1.551	.127	.011	.646
	2 Office	41	.991	.989	.993	.971	.672	1.682	.119	.052	.135
	3 Retail	75	.961	.945	.975	.928	.502	1.505	.169	-.018	.376
	4 Warehouse	29	.960	.948	.960	.895	.556	1.222	.121	-.038	.172
	5 Other	17	1.016	.913	1.019	.936	.617	1.084	.114	.013	.582
	Overall	189	.971	.968	.971	.936	.502	1.682	.141	-.012	.355
82	1 Apartment	88	.987	.986	.988	.997	.530	1.554	.118	-.016	.349
	2 Office	50	.977	.972	.981	.972	.596	1.668	.170	.007	.789
	3 Retail	154	.975	.973	.977	.921	.417	1.942	.227	-.041	.019
	4 Warehouse	61	.968	.960	.969	.920	.548	1.715	.179	-.013	.603
	5 Other	13	1.054	1.006	1.095	.949	.440	1.677	.202	-.060	.227
	Overall	366	.979	.979	.979	.947	.417	1.942	.185	-.027	.009
84	1 Apartment	67	1.014	1.010	1.016	1.011	.788	1.689	.107	-.039	.120
	2 Office	66	.925	.923	.927	.877	.468	1.865	.188	.024	.447
	3 Retail	88	.956	.953	.960	.956	.520	1.912	.224	.036	.263
	4 Warehouse	50	.947	.947	.947	.871	.487	1.719	.169	-.015	.620
	5 Other	12	1.171	1.122	1.220	1.183	.988	1.459	.124	-.004	.924
	Overall	283	.975	.974	.976	.949	.468	1.912	.179	-.021	.090
85	1 Apartment	21	1.130	1.119	1.146	1.159	.911	1.456	.097	.113	.064
	2 Office	53	1.165	1.137	1.168	1.128	.580	1.841	.194	.025	.385
	3 Retail	97	1.041	1.029	1.066	.995	.484	1.954	.289	-.032	.328
	4 Warehouse	84	.877	.876	.878	.912	.514	1.936	.228	-.006	.776
	5 Other	18	1.062	1.019	1.106	1.080	.558	1.463	.211	.066	.187
	Overall	273	1.031	1.029	1.037	1.024	.484	1.954	.242	.016	.270
87	1 Apartment	25	.874	.873	.889	.907	.572	1.753	.216	-.003	.968
	2 Office	25	.875	.875	.996	1.037	.504	1.954	.396	.130	.188
	3 Retail	91	.915	.893	.924	.863	.435	1.947	.282	-.052	.142
	4 Warehouse	38	.911	.899	.923	.915	.475	1.958	.354	-.003	.968
	5 Other	6	1.092	.999	1.185	.760	.632	1.681	.299	-.148	.089
	Overall	185	.899	.893	.915	.891	.435	1.958	.309	-.026	.335
88	1 Apartment	91	.882	.877	.884	.905	.581	1.693	.139	.011	.646
	2 Office	58	.931	.922	.940	.910	.402	1.936	.260	.029	.531
	3 Retail	162	.950	.947	.952	.896	.394	1.962	.237	-.018	.376
	4 Warehouse	90	.886	.884	.888	.863	.466	1.881	.235	-.038	.172
	5 Other	21	1.002	1.000	1.007	1.008	.687	1.389	.141	.013	.582
	Overall	422	.916	.916	.917	.905	.394	1.962	.219	.000	.971

Appendix 3 (Continued)
Commercial Ratio Statistics by Property Type and Region

AREA	Property Type	Sales	Median	Median Conf Interval		Wtd Mean	Min	Max	COD	Price-Related Bias	
				Lower 95%	Upper 95%					PRB Coef.	PRB Sig.
89	1 Apartment	32	1.042	1.042	1.043	.998	.673	1.352	.109	.025	.407
	2 Office	23	1.065	1.033	1.066	.982	.669	1.383	.146	-.004	.911
	3 Retail	31	.920	.909	.949	.888	.541	1.466	.232	.044	.424
	4 Warehouse	18	.831	.825	.836	.857	.588	1.256	.167	-.067	.541
	5 Other	7	1.010	.868	1.152	.942	.627	1.356	.202	-.044	.575
	Overall	111	.969	.968	.975	.955	.541	1.466	.178	.030	.100
90	1 Apartment	32	.849	.830	.869	.867	.501	1.202	.205	.005	.885
	2 Office	20	.598	.584	.611	.747	.405	1.176	.320	.245	.010
	3 Retail	64	.857	.856	.858	.805	.402	1.391	.236	-.049	.103
	4 Warehouse	20	.858	.831	.885	.898	.559	1.340	.223	.012	.826
	5 Other	9	.647	.545	.782	.614	.439	1.435	.397	-.072	.536
	Overall	145	.830	.828	.831	.788	.402	1.435	.248	-.020	.322
91	1 Apartment	3	1.118	.784	1.186	1.058	.784	1.186	.120	.411	.077
	2 Office	7	1.271	1.230	1.284	1.187	.864	1.402	.100	.067	.649
	3 Retail	32	1.054	1.013	1.095	.972	.554	1.572	.196	-.085	.112
	4 Warehouse	6	1.119	.992	1.246	1.032	.842	1.336	.172	-.146	.249
	5 Other	2	.876	.618	1.133	.905	.618	1.133	.294	.802	.
	Overall	50	1.113	1.107	1.118	1.003	.554	1.572	.180	-.076	.065