



**Department of
Taxation and Finance**

Overview of the Market Analysis Process

ORPTS Processes and Programs

MTA Trend Development

- Components of Process:
 - Ratio Analysis
 - Analysis of sales ratios over time
 - Sale Price Analysis
 - Unit-Value comparisons over time
 - Results Review and Final Determination
 - Use trend to Time Adjust Sales Prices

MTA Ratio Analysis

- Ratio Analysis data preparations:
 - Extract data from Data Warehouse
 - 3 to 5 years of sales
 - AV from roll prior to earliest sale
 - Filter Data
 - total site, number parcel, part of parcel, COD & RAR useable, arms length, new construction, significant change, missing data, duplicates
 - Property Classes: 210, 215, 220, 230, 240, 241, 242, 250 & 260

MTA Ratio Analysis

- Ratio Analysis data preparations:
 - Normalize Ratios
 - Divide by median ratio
 - Adjusts median to 1.00
 - By SWIS

Original	Normalized
0.90	1.50
0.85	1.42
0.70	1.17
0.75	1.25
0.60	1.00
0.50	0.83
0.40	0.67
0.30	0.50
0.25	0.42

MTA Ratio Analysis

- Ratio Analysis data preparations:
 - Trim Ratios
 - Inter-quartile Trim for outliers
 - Filter out towns with COD > 35
 - Absolute minimum of 200 sales
 - Extend time period
 - Combine market areas

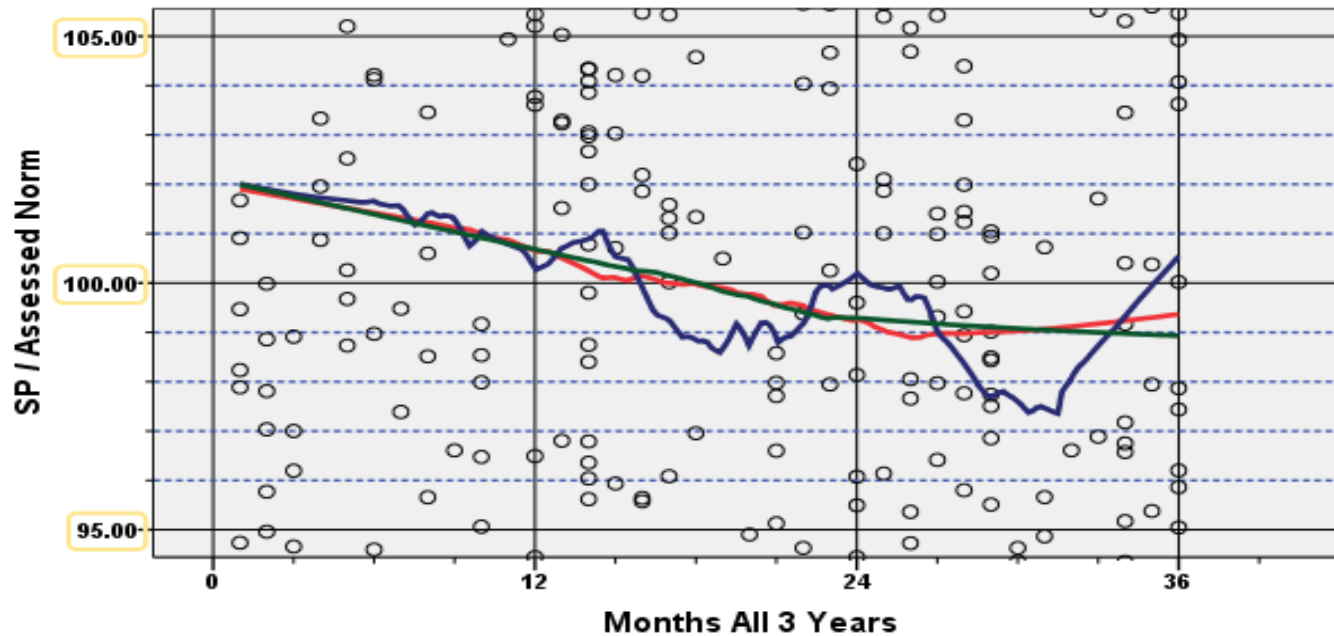
MTA Ratio Analysis

- Ratio Analysis
 - Scatter Plot Graphs of Normalized Ratio
 - plotting the data allows the analyst to visualize trends
 - Regression of Normalized Ratio
 - Variables included for - time, SWIS, property class and value-z
 - > Allows the model to be able to adjust for any assessment regressivity or progressivity that may confuse time trends in ratios

Scatter Plot Graphs of Normalized Ratio

Trend Lines - Market Area 181

Blue = 25%, Red = 50% and Green = 75% Loess



Regression of Normalized Ratio

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	113.936	1.746		65.243	.000
month Months All 3 Years	-.129	.050	-.099	-2.563	.011
valuez	-4.471	.515	-.334	-8.678	.000

- Convert monthly time coefficients into yearly trend estimates
 - Divide by Mean Normalized Ratio
 - Compute three year trend minus two year trend
 - Individual Towns can have trends different from rest of Market Area

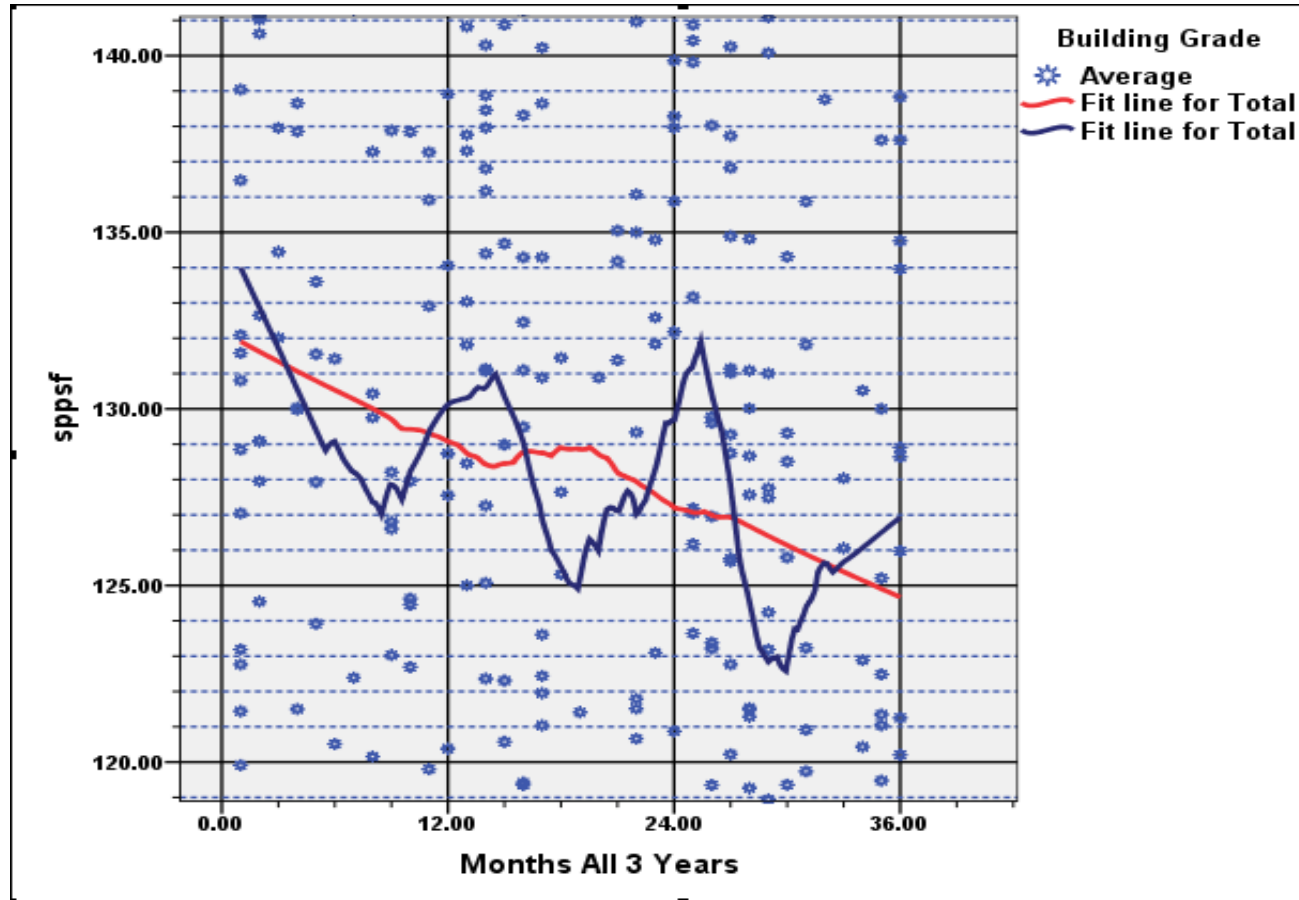
MTA Sale Price Analysis

- Sale Price Analysis data preparations:
 - Extract data from Data Warehouse
 - 3 or 5 years of sales
 - Filter Data
 - total site, number parcel, part of parcel, COD & RAR useable, arms length, new construction, significant change, missing data, duplicates
 - Property Classes: 210, 215, 220, 230, 240, 241, 242, 250 & 260
 - Sale Price, SFLA, insufficient representation of inventory items

MTA Sale Price Analysis

- Sale Price Analysis:
 - Scatter Plot Graphs of SPPSF (sale price per square foot)
 - Using only C Grade sales
 - Regression of Sale Price
 - Transform variables: time, location & inventory items (grade, condition, etc.)
 - Inventory is from the most current roll year

Scatter Plot Graphs of SPPSF



Regression of Sale Price

Coefficients^a

Model=19

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	97870.068	7005.289		13.971	.000		
mo_p05 Months Squareroot	-2596.545	903.799	-.041	-2.873	.004	.938	1.066
sfla Square Foot of Living Area	102.778	5.172	.706	19.872	.000	.154	6.495
age_05_f Square Root of Age SF -> \$/SF Adj.	-5.450	.531	-.271	-10.259	.000	.278	3.601
cnd_2_f Condition Fair -> \$/SF Adj.	-15.054	4.562	-.047	-3.300	.001	.953	1.049
cnd_4_f Condition Good -> \$/SF Adj.	20.114	2.165	.148	9.289	.000	.763	1.311

MTA Trend Development

■ Results Review and Final Determination

*Ratio 7/09-6/10 Analysis:.

*Loess graph -> .50%.

*-2% over 3 years, -20% of 3 year during 7/09-6/10.

*Linear graph ->-.50%.

*Power ratio model -> -1.5%.

*-5% over 3 years, -1% established -> -4%.

*Spline ratio model ->na.

*INITIAL CONCLUSION: 0%.

*sppsf graph -> -1.56%.

*-5% over 3 years, 29% of 3 year during 7/09-6/10.

*Power sale price model -> -1%.

*-6% over 3 years, -1% established ->-5%.

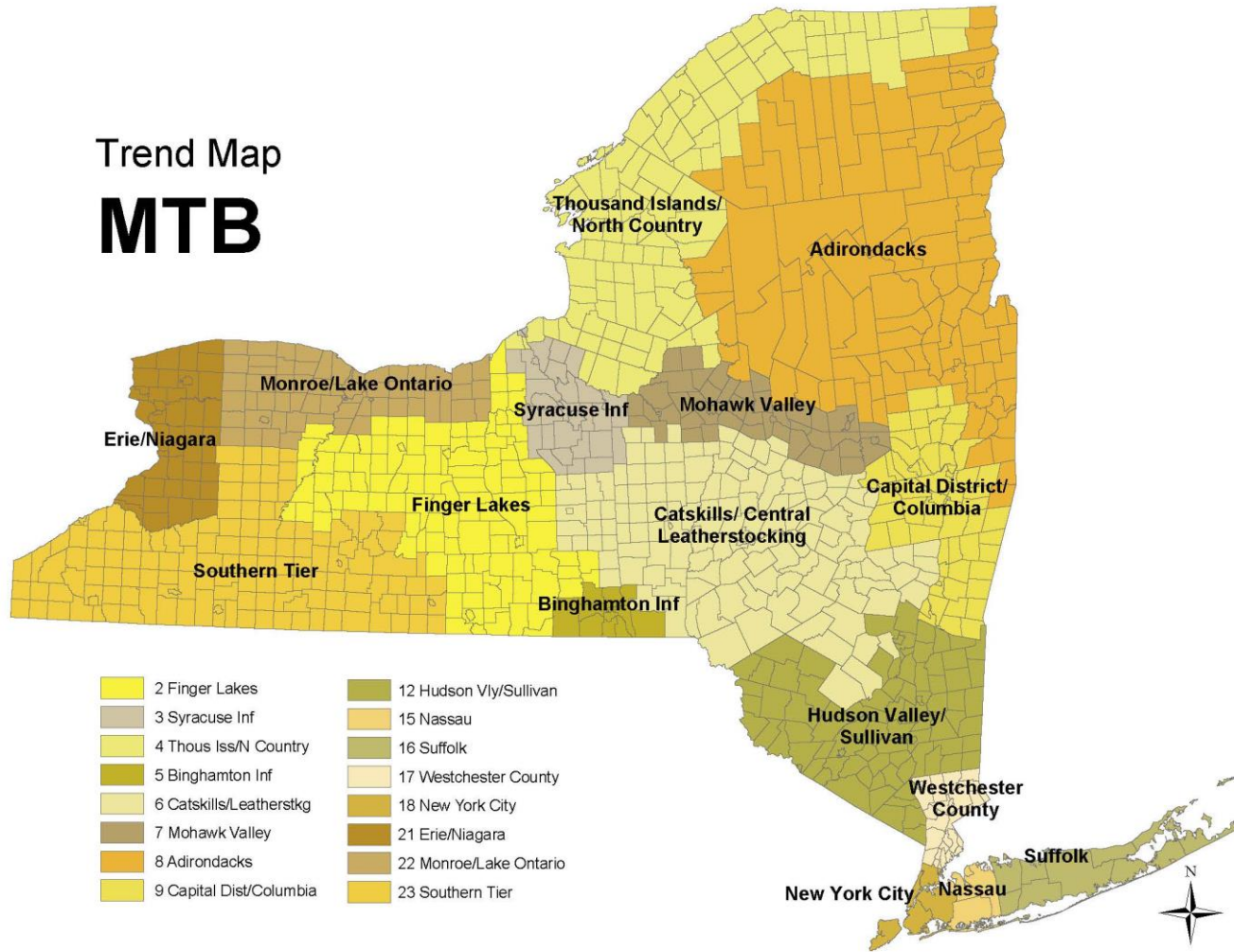
*Spline sale price model -> n/a%.

*FINAL CONCLUSION: -1%.

MTB and MTC Trend Development

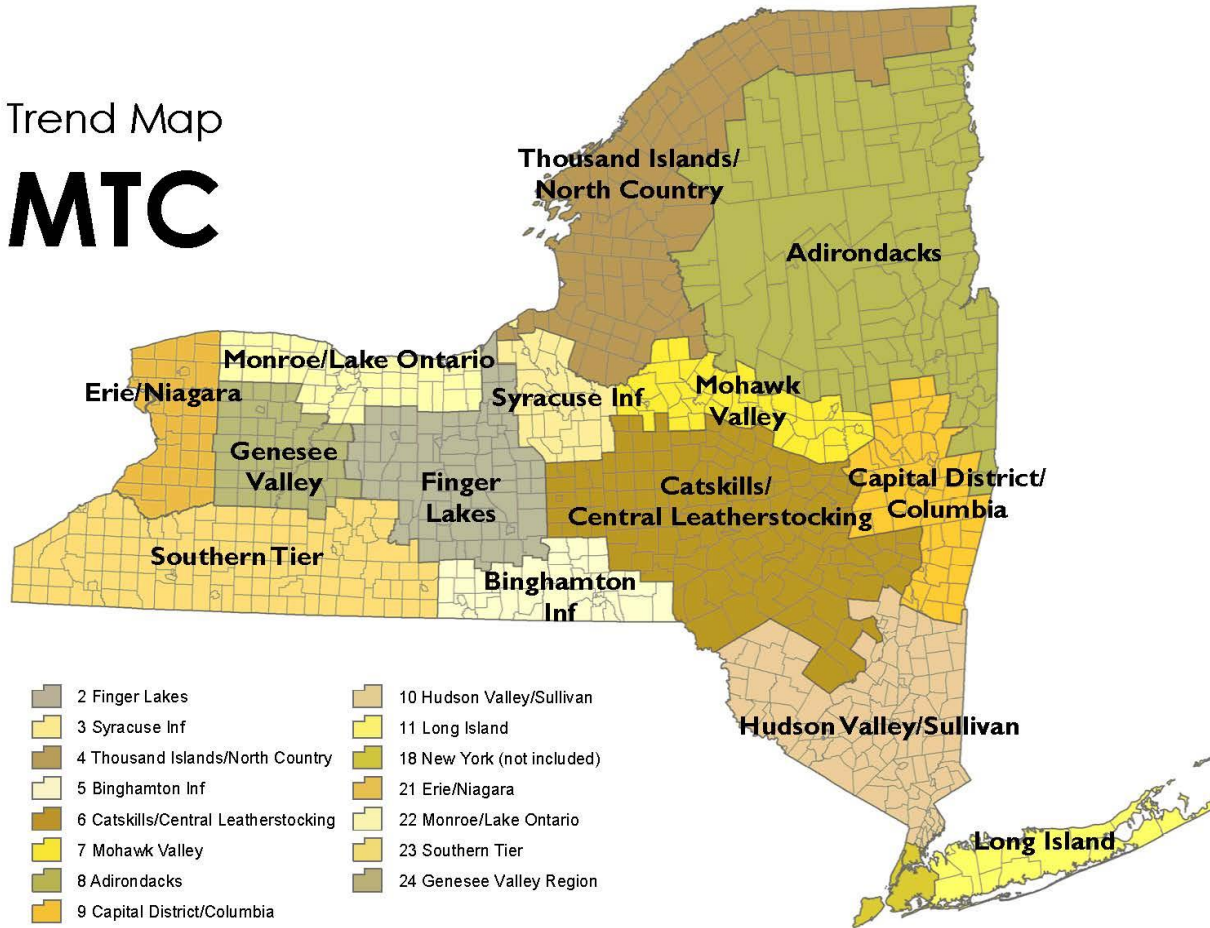
- Similar to residential analysis
 - Use regression to measure changes in ratios over time
 - Assessing units are grouped into “clusters” of similar market influences (see maps following)
 - “Clusters” are large due to lack of sales
- Trends are developed by property class “groups” (see charts following)

Trend Map MTB



Trend Map

MTC



MTB Groups

- Apartment: 411
- Lodging : 414, 415, 417 & 418
- Eating/Drinking: 420, 421, 422, 423, 424, 425 & 426
- Retail (large): 450, 451, 452, 453, 454 & 455
- Retail (small): 480, 481, 482, 483, 484, 485 & 486
- Bank/Office: 460, 461, 462, 463, 464 & 465
- Warehouse: 440,441,442,443,444,445,446,447,448,449
- Car Sales/Service: 431, 432 & 433
- General Commercial Use: 400, 410, 416, 430, 434, 435, 436, 437, 438, 439, 470, 471, 472, 473, 474, 475, 500's, 600's and 700's

MTC Groups

- Farm Land: 100's
- Small Lots: 310, 311, 312 & 314 (not coded "W")
- Waterfront Lots: small lots coded "W", plus 313 & 316
- Commercial/Industrial Land: 330, 331, 340, 341, 350 & 380
- Large Tracts (General Vacant Use): 300, 315, 320, 321, 322 & 323
- Forest Land: 900's

MTB and MTC Trend Development

- Direct Approach
 - MTA sales are not used.
 - MTB and MTC sales are used in two independent analyses.

MTB & MTC Ratio Analysis

- Ratio Analysis data preparations:
 - Extract data from DW: 3 to 5 years of sales
 - AV from roll prior to earliest sale
 - Start with MTB and MTC sales
 - Only sales from roll section 1 or 6
 - SP/AV Ratio
 - Sale Normalization: Divide by median ratio
 - Interquartile Trim: Twice

MTB & MTC Ratio Analysis

- Ratio Analysis: Graph and Model
 - Similar to residential analysis: build transformations, look at graphs and generate regression models.
 - Completed at a cluster level
 - Trends developed and applied at SWIS level by percent of AV by strata (see examples)

Applying Commercial Trends

Commercial Group	Trend	% of MT	
Apartments	8%	31%	2.5
Lodging	5%	7%	.04
Eating/Drinking	5%	11%	.06
Large Retail	5%	1%	0.5
Small Retail	5%	24%	1.2
Bank/Office	5%	9%	.45
Warehouse	1%	12%	.12
Car Sales/Service	5%	1%	.05
General	5%	2%	.01
Total			4.93%

Major Type D: Utility

- Trend developed by ORPTS' Valuation Services
- Establish cost estimates for utility property at the latest levels available (e.g. – 2015 for 2016 FVM)
- Compare to the prior year cost estimates (e.g. – 2014)
- Difference is trend
- If reassessments adopt utility advisories, ratio for D class is 100%

CAMA and Sales Ratios

ORPTS Market Analysis Process

Residential – Sales Ratios

- Calculate Sales Ratio – at municipal level
 - Don't need inventory
 - Valid, arm's length, ratio-useable sales
 - AV/Time-adjusted SP = ratio
 - From 1 – 5 years of sales depending on number of available sales in municipality – at least 25
 - Trim using Interquartile Range Method
 - **Use weighted mean ratio**
 - Do confidence level testing to assure ratio is reliable
 - Perform tests for Sale-Price Dependent Assessed Values (SPDAV)

Why Weighted Mean?

Town of Smallville			
– made up of 3 parcels – all sold on valuation date			
Parcel Number	Total Assessed Value	Time-Adjusted Sale Price	Parcel AV/MV Ratio
1	\$100,000	\$100,000	1.00
2	\$120,000	\$150,000	0.80
3	\$150,000	\$200,000	0.75
Town Totals	\$370,000	\$450,000	
	Mean	Median	Weighted Mean
Ratio Measures	0.8500	0.8000	0.8222
Full Value Est.	\$435,294	\$462,500	\$450,000

Residential – SPDAV

- **Sale Price Dependent Assessed Values**
- SPDAV testing
 - Sales compared to non-sold properties
 - Number of assessment changes
 - Degree of assessment changes
 - *Statistical tests to determine if assessment changes for sold properties reflect assessment changes for unsold properties*

Residential – SPDAV

- SPDAV testing
 - Preponderance of evidence considered
 - Negative connotation to “failure”, but
 - All it really means is that the sales ratio may not represent the unsold parcels, but this may be appropriate if the changes are due to changes in the market place
 - Market analysts can perform procedures to eliminate SPDAV effects and produce a useable sales ratio

Residential – CAMA Modeling

- Develop Regression Model (CAMA) – for each market area
 - Valid, arm's length sales
 - Use inventory – edit for critical information
 - Some sales will be dropped for missing or invalid inventory
 - 3 years of sales – need approx. 300 sales for best result
 - Develop a statistically sound model to re-predict time-adjusted selling price
 - Model is used to determine aggregate value of residential properties not individual values

Residential – CAMA Modeling

- Apply Regression Model to Subject Properties – at municipal level
 - Exclude properties not included in Sales model
 - Apply equation (model) to Subject inventories
 - Trim outliers
- Calculate Subject Ratios
 - Use Assessed values from measured roll
 - $AV/Predicted\ Market\ Value = Ratio$
 - Trim using Interquartile Range Method
 - Calculate weighted mean

Residential – CAMA Modeling

- Apply Regression Model to Subject Properties – at municipal level
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 - Apply equation (model) to Subject inventories
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