EIGHT MISTAKES TO AVOID WHEN DESIGNING YOUR MODEL DEVELOPMENT PROCESS

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INTRODUCTION

MISTAKE #1: NOT COMMITTING TO MODEL DEVELOPMENT AS INTEGRAL PART OF THE VALUATION PROCESS

MISTAKE #1: NOT COMMITTING TO MODEL DEVELOPMENT AS A PROCESS

- It is a mistake to not think of model development as integrated with your main valuation process, but instead as something that mysteriously happens outside of it.
- A few important considerations:
  - Define the steps of how model development fits into the overall valuation process.
  - Educate your staff on the process and its importance
  - Make sure it is both integrated and repeatable
  - Continually refine your process
  - Get the right tools (software or otherwise)
  - Bring in people to help you (if necessary)
  - Understand what your CAMA system can do

MISTAKE #2: NOT INVESTING IN DATA QUALITY

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- An investment in data quality is ultimately an investment in better quality values and may improve the quality of your values more than anything other step.
- Poor data quality will necessarily lead to:
  - Lower quality property value estimates
  - A more resource-consuming model development process
  - A large resource allocation requirement to rectify the situation
- In conjunction, technology, statistical sampling, data edit checks, modern CAMA systems, and quality control measures can be used to improve data quality.
- The IAAO has recently published a new *Standard on Data Quality* that warrants immediate consideration.

MISTAKE #3: NOT UTILIZING APPROPRIATE TIME ADJUSTMENT STRATEGIES

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- When developing models, time adjustment strategies must be used with sales and income data for several reasons:
  - Increases the quality of the values by removing a source of error
  - In a changing market, it makes it possible to assess at 100% of market value

The following factors can make this challenging:

- Tight administrative timelines
- Delays in verifying sales or collecting income data
- Poorly designed modeling processes
- Uncooperative or untrained appraisal staffs

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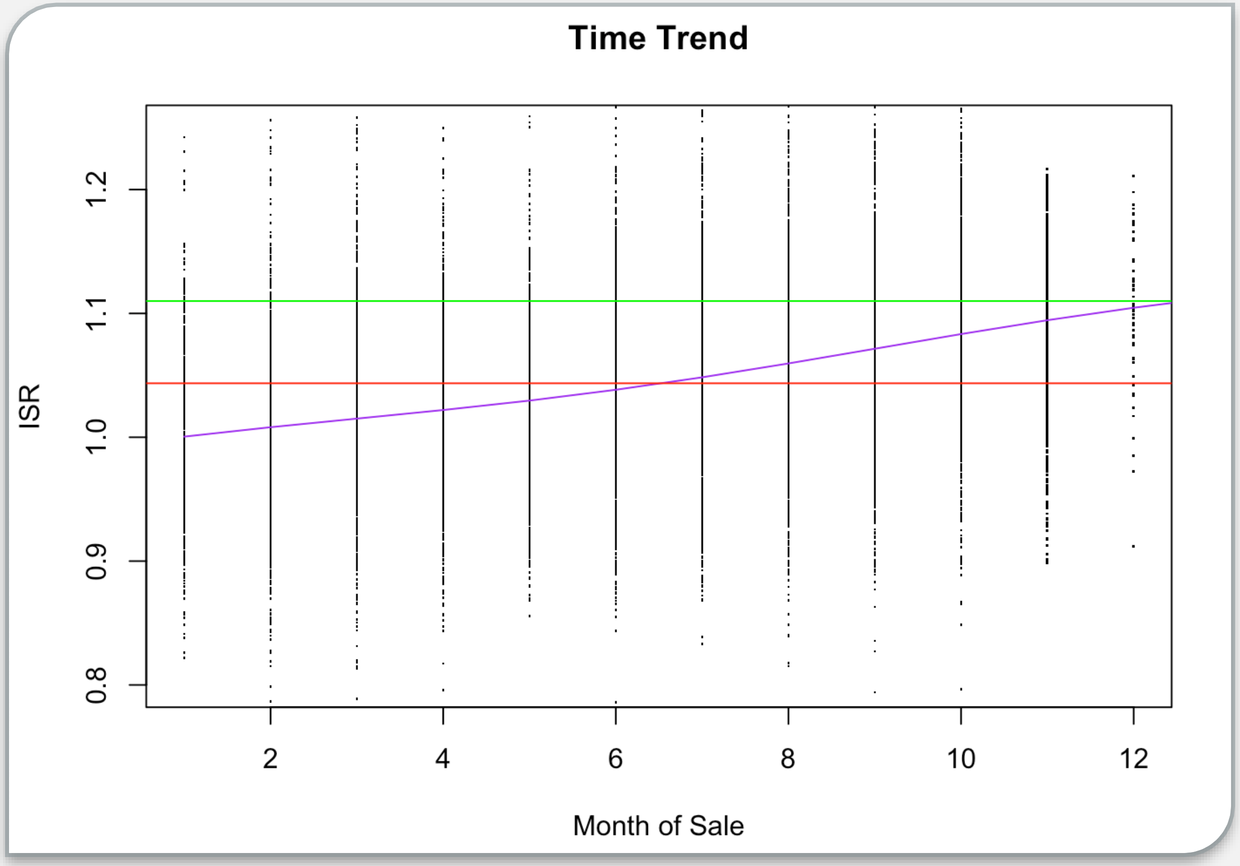
- The purple trend line is the best fit to the data. It would be used to adjust all sales up to the valuation date.
- The red line is the median inverse sales ratio. The green line is the inverse median sales ratio time-adjusted as of January 1.
- Without time adjusting using the purple line (or otherwise accounting for time), the target assessment level would be about six percentage points too low.



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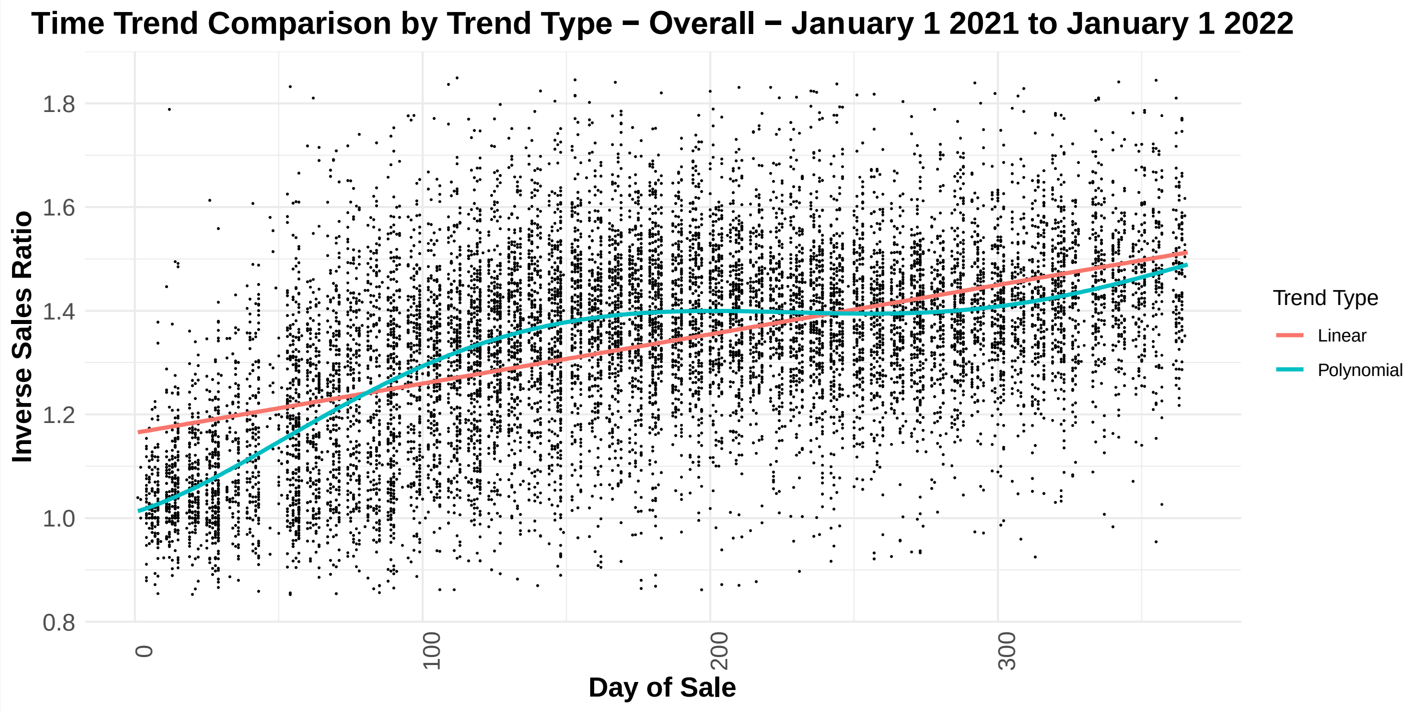
- The pandemic surge in housing prices, especially in the year 2021, should remind us that time adjustment strategies must also appropriately capture the time trend.
- Example from Williamson Central Appraisal District in 2021.



MISTAKE #4: NOT TRYING MULTIPLE MODELING STRATEGIES

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The type of property dictates the approach(es) to value that are appropriate.

Type of Property	Cost Approach	Sales Comparison Approach	Income Approach
Single-family residential	2	1	3
Multifamily residential	3	1, 2	1, 2
Commercial	3	2	1
Industrial	1, 2	3	1, 2
Nonagricultural land	–	1	2
Agricultural[a]	–	2	1
Special-purpose[b]	1	2, 3	2, 3

[a] Includes farm, ranch, and forest properties.

[b] Includes institutional, governmental, and recreation properties.

Source: IAAO Standard on Mass Appraisal

MISTAKE #4: NOT TRYING MULTIPLE MODELING STRATEGIES

- However, within each approach to value, there are various modeling strategies. This is especially true of the sales comparison approach.
- Some modeling strategies will produce better results than others.
- Testing all strategies gives you the best chance of success at obtaining the most accurate, precise, and explainable values that meet your goals.
- Often, multiple approaches are not tried because of:
  - Ingrained thinking
  - Fear of breaking the smooth chain of values with a new method

MISTAKE #5: NOT ROUTINELY CALIBRATING YOUR MODELS USING AN APPROPRIATE STATISTICAL ANALYSIS

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- The IAAO Standard on Automated Valuation Models (AVMs) states the following:

"The various methods and procedures (some examples are: regression, artificial neural networks) used to calibrate the AVM drive accuracy and credibility of the estimate."

- Assessing jurisdictions often do not fully calibrate their models using an accepted statistical methodology. Manual calibration, partial analytical calibration, or trending are often used.

MISTAKE #5: NOT ROUTINELY CALIBRATING YOUR MODELS USING AN APPROPRIATE STATISTICAL ANALYSIS

- Beside lower quality values, this creates a host of other potential problems, such as:
  - Imbalanced table (model) rates
  - Reliance on problematic trending techniques
  - Lack of trust in valuation models
  - Added difficulty in consistently partitioning land and building values
  - More difficulty in updating valuation model rates in the future (kicking the can…)

The lack of routine model updates appropriately makes matters worse.

MISTAKE #6: INADEQUATE USE OF RATIO STUDIES FOR MODEL QUALITY ASSURANCE

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- Local jurisdictions do not always use ratio studies proactively. If they do use them, they are often not conducted properly or with the right design plan.
- However, ratio studies should be used when developing models and throughout the assessment process. The IAAO Standard on Ratio Studies states the following:

"Local jurisdictions should use ratio studies as a primary mass appraisal testing procedure and their most important performance analysis tool."

MISTAKE #7: NOT LEARNING FROM OTHERS

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- Be open-minded about the future.
- Expose yourself to new ideas and invest in education.
- Connect with others in the world who are doing a good job.
- Utilize the Socratic Method.

MISTAKE #8: NOT EXPLAINING THE MODEL WELL TO OTHERS

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- Model results and development decisions must be documented.
- Make others a part of the model development process.
- Communicate frequently and effectively with other stakeholders.
- Educate all parties involved on the results of the model.
- Be transparent.

BONUS MISTAKE: SALES CHASING

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- Sales Chasing could be accomplished by:
  - Overriding the land or building value of a sale property
  - Micro-adjusting subjective attributes of sale properties
  - Overfitting mass appraisal models
- In addition, only validating sales that match closely to the sale price is similar in effect to sales chasing.
- Sales Chasing doesn't just affect post-hoc sales ratio studies. It also affects model quality and the effective allocation of resources in the model development process.
- Predicting the sale price too well is not a good thing. If CODs are very low in a given stratum (e.g. 2 or 3), it is almost certainly too good to be true.

BONUS MISTAKE: OVERFITTING SALES

- Common causes of model overfitting include:
  - Determining adjustments (e.g. location, style, etc.) based on a low number of sales
  - Using too many binary variables ("presence of" variables coded as 0 or 1)
  - Giving too much weight to sales of the subject property in a comparable sales routine
- What can you do?
  - Improve model development practices
  - Prevent staff from creating adjustments based on too few sales
  - Use holdout samples or advanced methods like cross-validation

QUESTION AND ANSWER

- Thank you for coming.
- If you have any questions after today, please contact me:
  - Josh Myers (jem8p@yahoo.com)