THE CENTER FOR STATE AND LOCAL FINANCE

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Wheel of Fortune:

What Pat Sajack Didn't Tell You

I would like to buy a vowel !



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What is forecasting?

- Textbook Definition: Forecasting is predicting the future as accurately as possible, given all of the information available, including historical data and knowledge of any future events that might impact the forecasts.

Why is forecasting challenging?

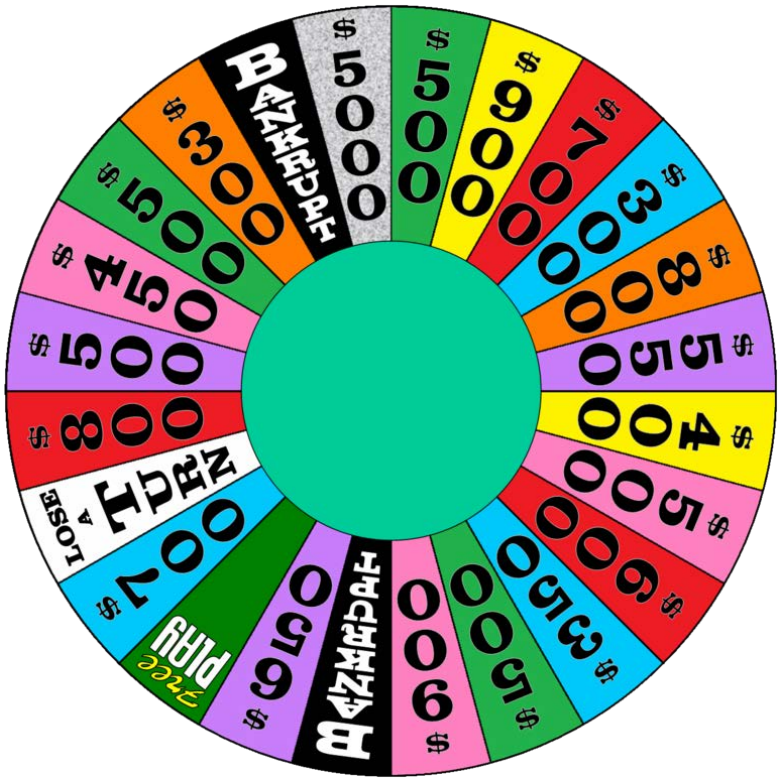
- A forecast must be based on what we know at the time, and things could change.
- What you forecast is going to be a result of a complex confluence of events, some of which are difficult or impossible to predict.
  - As a result, it is better to think of a forecast as a range of possibilities rather than one expectation.

Example: A Wheel of Fortune Forecast

Simplifying Assumptions

- Player has earned $5,000 at the time of the spin.
- Choose a consonant and two turn out to be in the puzzle.
- The expected value of one such spin is about $15K but has a range of likely outcomes that includes -$5K and $1 million.

2014 First-Round Wheel



Why would a city or county use forecasting?



Why would a city or county use forecasting?

- Inform budget, capital, and staffing for both long and short-term plans.
  - Are revenues sufficient to cover expected expenditures under current conditions?
  - Are revenues sufficient to implement new projects or endeavors?
  - What is happening to population and other factors that affect the city?

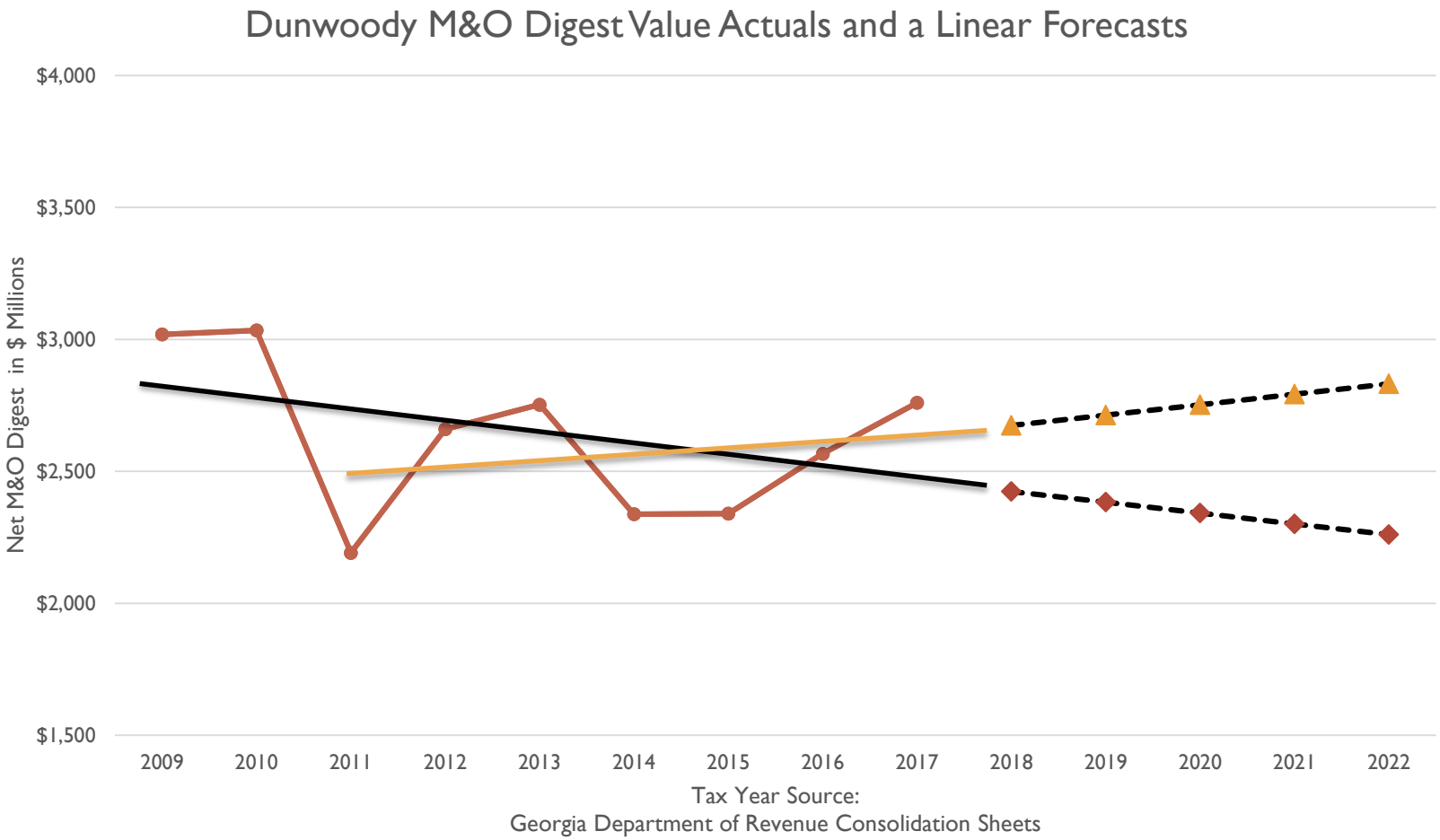
Why would a city or county use forecasting?

- City officials who do the background research in order to generate an informed forecast learn a lot of valuable information.
  - Discussing local economic conditions with members of the community
  - Looking into proposed state policy changes that might affect local conditions

What would a city or county forecast?



Property Tax



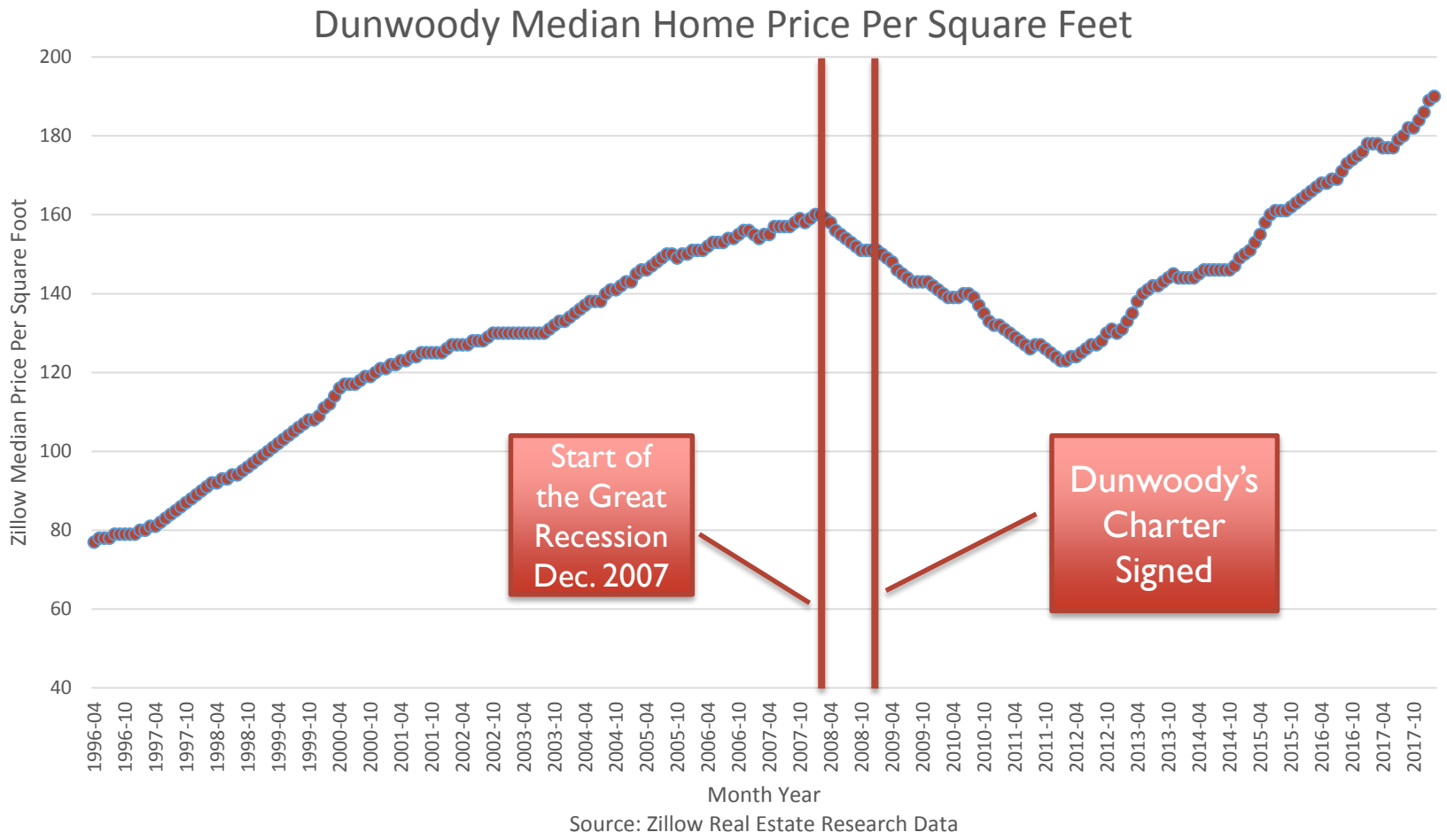
Why property tax revenue?

- Primary local revenue source
- Due to the relative slow change to property values and the assessment process, property tax digests have been less volatile and easier to predict/forecast.
- The Great Recession created declining statewide property tax digests.

Property Tax Revenue

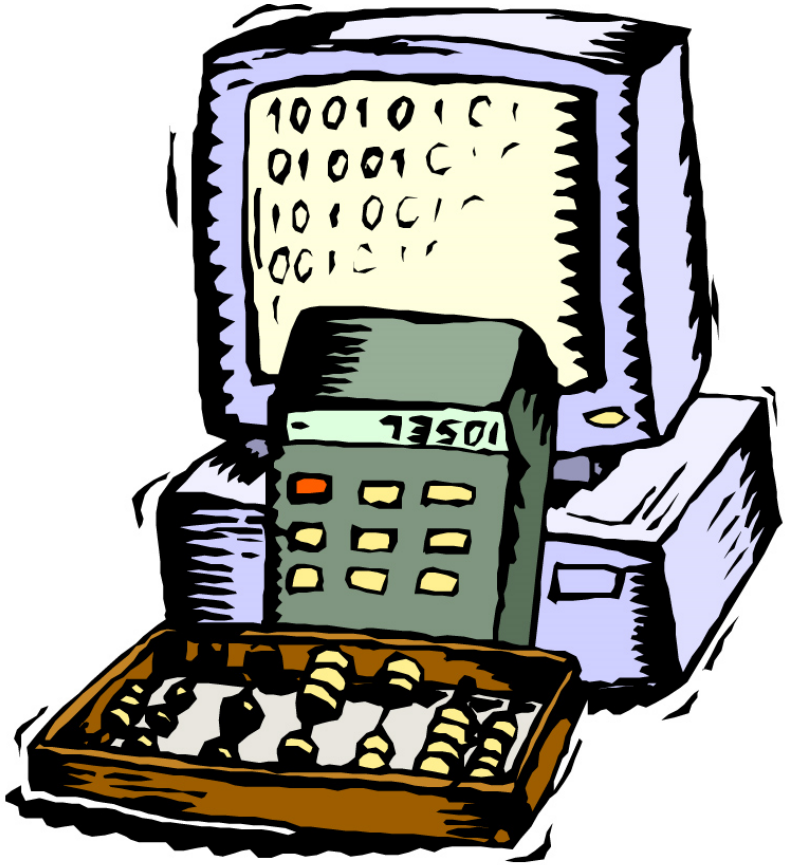
- Outside of the Great Recession, the current underlying trend in the digest can be used to construct forecasts.
  - Linear trend line forecast (Ordinary Least Squares)
  - Recent year-to-year changes applied to the current digest

What is driving property tax revenue?



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How would a city, county or state forecast?



How would a city, county or state forecast?

- In-house calculations based on known data and knowledge about changing conditions
  - Methods for calculating forecasts range from very basic to extremely advanced. The simplest forecasts provide very useful insight, inform decisions, and assist in planning.
- Observed mean and variance combined with information from local sources is enough to generate a meaningful and helpful forecast.

How would a city, county or state forecast?

- Statistical forecasting can be analytically intensive.
  - Least squares linear forecasts
  - Holt-Winters Smoothing
  - Auto-Regressive Integrated Moving Average models
- In practice, forecasters choose the model that best fits the known data and use it to predict future values.

How would a city, county or state forecast?

- Related and existing local forecasts free or for purchase
  - Georgia Office of Planning and Budget provides population-by-age-group forecasts for all Georgia counties, and other publicly available datasets do the same by race.
- Macroeconomic Forecasts
  - Congressional Budget Office
  - Wall Street Journal Economic Forecast Survey
  - Survey of Professional Forecasters
  - IHS Global/Moody's Analytics

How would a city, county or state forecast?

- Forecasts, regardless of the level of sophistication, help cities and counties plan for the future.

What is a Good Forecast?

You just ignored the 70%

Well, did it snow on Monday or not?

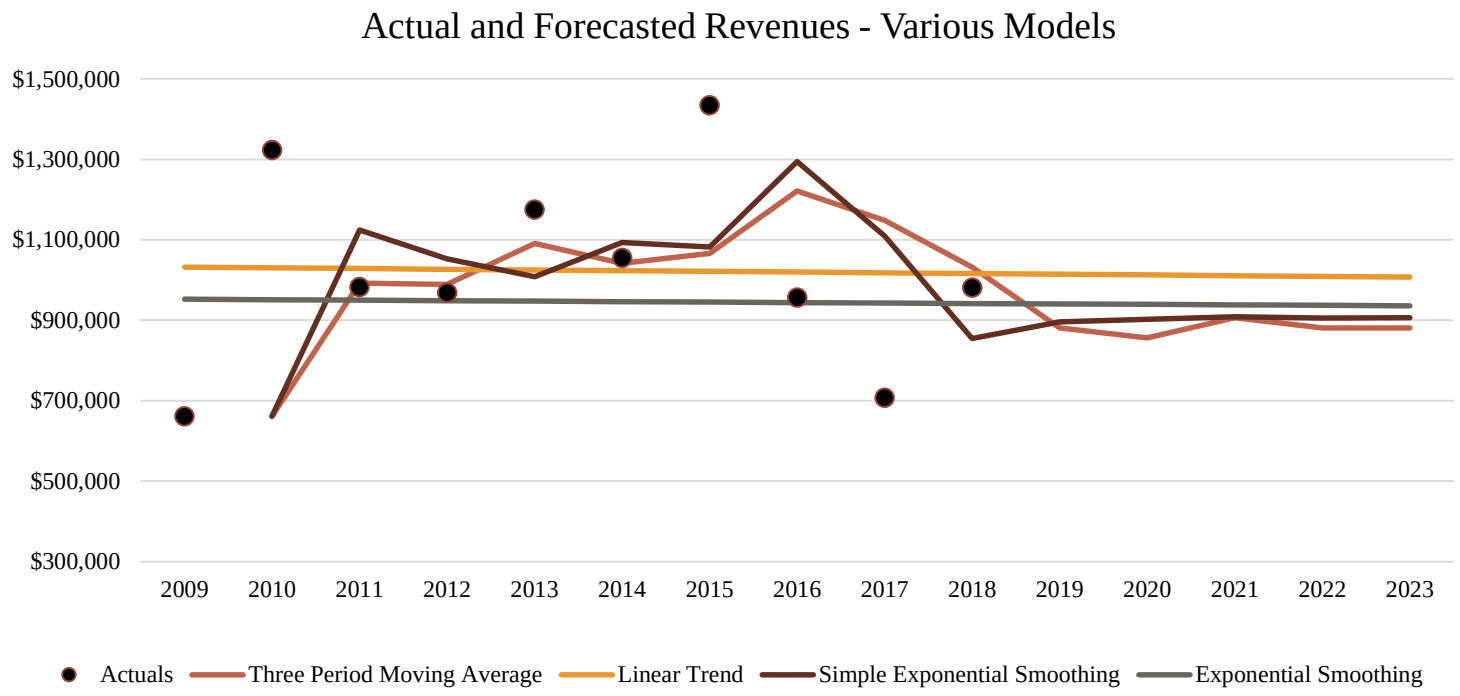


What is a good forecast?

- As stated on the third slide: “It’s better to think about a forecast as a range of likely outcomes rather than one expectation.”
  - A forecast produces both expected values and a variance for that expectation. For the weather forecast, it is a percent chance of snow, and for a revenue forecast, it is a confidence interval.
  - Only with both pieces of information do you know about the quality of a forecast.

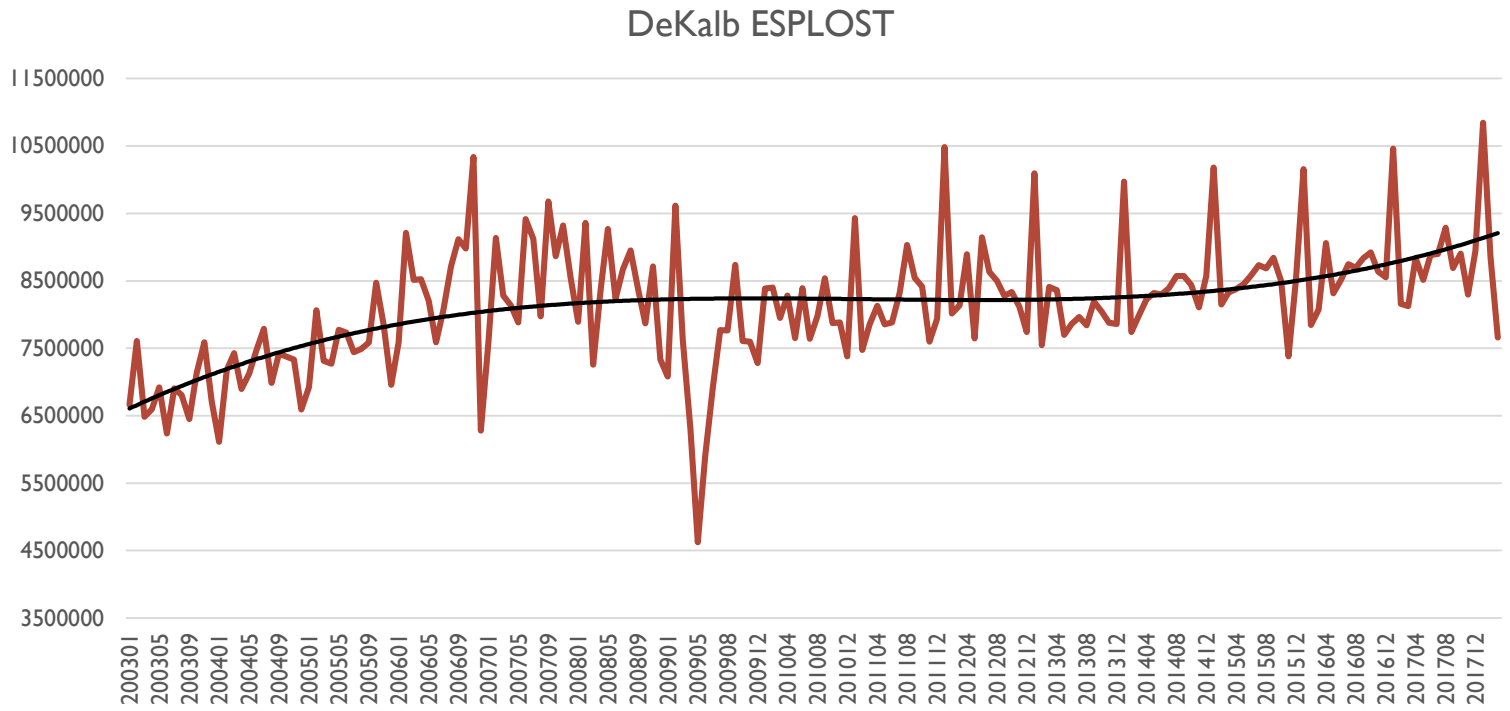
Accuracy

- Accuracy relates to how the expected value(s) from a forecast compare to the observations being modeled.



Confidence

- Confidence relates to the range of possible values where the actual(s) are highly likely to fall within.



Conclusion

- Cities' and counties' ability to plan for the future is benefited by forecasting or from obtaining forecasts.
- Forecast models range from a simple mean and standard deviation to in-depth computational models implemented by professional forecasters.
  - The model that best fits the data is chosen.
  - Even the simplest models help.
- Good and bad forecasts do not indicate the level of confidence in a specific prediction, but rather a model's ability to match the mean and variability of the observed data (goodness of fit).

Thank You! Any Questions?

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