

Consider This: Residential

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Draw more from your data

Statistical analysis software can help you turn complex data into clear and compelling visualizations

Recent changes to Fannie Mae guidelines require appraisers to provide support for market condition adjustments as of Feb. 4, 2025. The new requirements put an even greater emphasis on objective, data-backed support, which means presenting increasingly complex data in ways that communicate clear and compelling visual evidence of

valuation results. To do so, appraisers can turn to advanced data analysis and visualization tools such as R.

A powerful open-source programming language and software environment, R is widely used for data analysis, statistical modeling and data visualization by statisticians, data analysts and researchers. Its comprehensive collection of

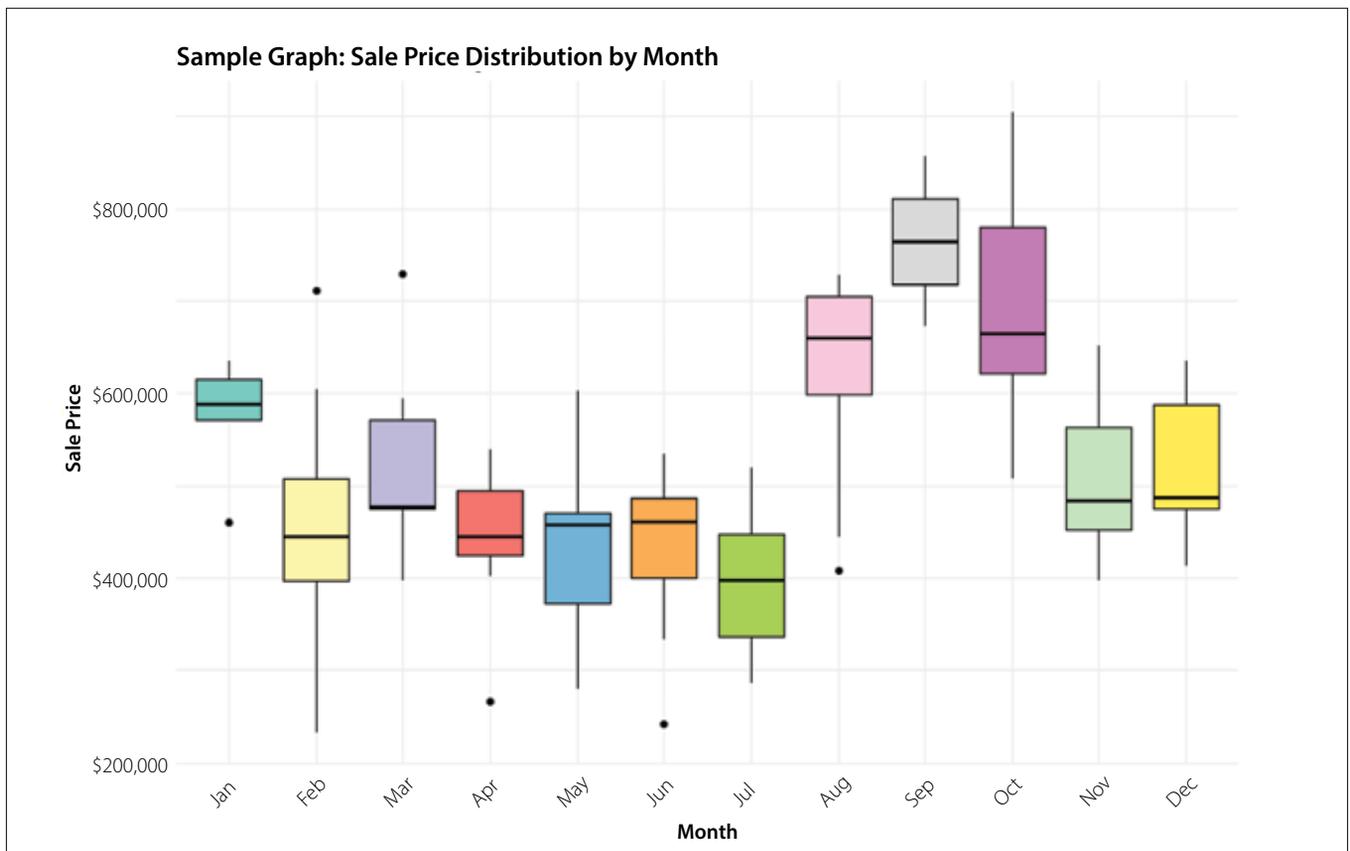
statistical tools and visualization packages make it an ideal choice for appraisers too.

Making the case for visualizations

Understanding how to properly report and adjust for shifting market conditions is crucial. Appraisers are tasked with deciphering a complex array of influences that shape

property values over time. These factors range from broad economic trends to subtle shifts in neighborhood dynamics — each playing a role in determining the market value of residential properties.

Consider the fundamental drivers of supply and demand. When new jobs flood into a city but housing development lags behind, prices surge. Con-



This box plot, created with the software R, allows viewers to visualize the spread and central tendency of the data, easily distinguish between months thanks to the use of color, understand how sale prices change throughout the year, and identify months with unusually high or low prices.



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versely, overbuilding can cause values to stagnate. Recognizing where a market stands within the broader real estate cycle — whether it's recovering, expanding or contracting — can give appraisers critical insight into future trends.

Economic forces also come into play. Changes in employment rates, inflation and interest rates all leave their mark on the housing market. High inflation can push construction costs up and erode purchasing power, while fluctuating mortgage rates can open or close the door to homeownership for many buyers. The role of the appraiser is to translate these macro-level shifts into reliable, market-reflective valuations.

But market conditions are influenced by more than just economic indicators. Zoning changes, infrastructure projects and social trends can alter the appeal and value of specific areas. A new subway line or a thriving neighborhood school can spark interest and boost property values. On the other hand, an area with environmental concerns may see reduced demand. The interplay of such factors requires an appraiser to see beyond the numbers, connecting the dots between community changes and property values.

All of this complexity highlights the importance of integrating detailed, localized market data and property-specific adjustments. Statistical techniques, like regression analysis, help appraisers make sense of these influences and

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derive adjustments that reflect true market conditions. By understanding both broader trends and property-specific attributes, appraisers can deliver valuations that are not only technically accurate but also defensible.

To communicate these findings effectively, data visualizations are invaluable. They can reveal patterns, highlight trends and make complex relationships easier to understand. To create them, appraisers are using advanced tools like the statistical analysis software R. From showing the impact of market cycles to illustrating changes in value, R can help you make sense of the intricate forces driving real estate — transforming data into insights that are clear and actionable.

Bringing real estate data to life

R supports a wide range of statistical methods, from descriptive statistics and hypothesis testing to more advanced methods such as linear regression, time series analysis and multivariate analysis. The language has a rich ecosystem of packages — maintained and shared by statisticians and data

scientists worldwide — that extend the ability to perform complex statistical tests.

R provides a variety of functions to preprocess, clean and transform data. Its intuitive, flexible tools make data-wrangling tasks simpler and more readable, speeding up the analysis process.

R enables you to create reproducible code, so statistical results can be revisited and verified. You can create dynamic reports that combine code, results and narratives, making the presentation of data both reproducible and informative.

One of R's greatest strengths is its rich and compelling visualization capabilities, which can help you create complex visuals such as scatter plots, bar charts, line charts, heat maps and even custom infographics. Visualizations in R are highly customizable. You can adjust virtually every aspect of a graph, including colors, scales, annotations and themes, to highlight key data points. You can also build interactive dashboards that allow users to explore data on their own.

With R, you can easily add multiple layers of data visualization to a single plot — like

combining a line chart and bar chart, or adding statistical summaries over raw data points. This makes it easy to communicate insights in a detailed and multifaceted way.

R's tools also allow you to add custom labels, notes and context to your visualizations, ensuring that your audience understands not just what the numbers are but what they mean in a broader sense.

Overall, R combines powerful statistical analysis capabilities with excellent data visualization tools, making it an invaluable tool for telling stories through data. By enabling both in-depth quantitative analysis and compelling, interactive visual representation, R allows you to draw insights from complex datasets and communicate those insights in an engaging, intuitive way. ▲

ABOUT THE AUTHOR

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Learn more online

- Check out R at r-project.org.
- Read Jim Amorin's LinkedIn article, "Supporting Market Conditions Adjustments: A Comprehensive Guide for Appraisers," at bit.ly/3VTuhTP.
- See Fannie Mae's guidelines for market condition adjustments at bit.ly/3Z0tZiu.