

Analyzing Trends and Patterns in Real Estate Sales (2001-2020)

Uthista Vallabhaneni -

001252912Saint Louis University

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Instructor: Dr. Keith R. Hacke

Summary: This project explores the complex world of real estate, using data visualization and analysis techniques to uncover important insights from two decades of transactions (2001-2020). Three major pillars support the analysis journey: sales ratio analysis reveals market valuation dynamics; temporal analysis shows sales patterns over time; and spatial analysis pinpoints geographic hotspots. The conclusions provide investors, decision-makers, and innovators with strategic advice in addition to documenting the historical evolution of the market. This study shows how data-driven decision-making can be powerful, providing clear guidance for accurately and intelligently navigating the constantly shifting real estate market.

Introduction

As it makes its way through the complex world of the real estate market, this report aims to create a story that goes beyond the traditional confines of data analysis and combines quantitative results with strategic insights and useful information. Using an extensive dataset that captures real estate transactions from 2001 to 2020, this investigation aims to shed light on possible routes across the market's future landscapes while also reflecting the historical and present dynamics of the industry. The data, which is abundant in variety and breadth, provides a canvas on which categorical and numerical factors blend together to paint a complex picture of real estate transactions that captures the social, political, and economic processes that have dominated the past 20 years. This data-driven analytical journey aims to transform the findings into strategic insights by elevating them beyond the realm of data analysis. This will help stakeholders, such as investors, developers, and policymakers, not only understand current patterns and trends but also envision and architect impactful, data-driven, and future strategies. Therefore, this report aims to be a guide and companion as we explore the domains of data preparation, analysis, and visualization. It does this by telling the stories that are hidden within the data and by making it possible to turn these stories into strategic narratives that could influence future developments in the real estate market.

DEFINITION

When negotiating the complex terrain of real estate, clearly describing the issue serves as a guide for our analytical journey, making sure that our investigation is not only directed but also meaningful and focused on practical solutions. Because the dataset is both robust in terms of time and space, it can be used to investigate a wide range of questions. Three main areas of interest for this analysis are the changing trend of sales amounts over time, the geographic distribution of sales across towns, and the variation of sales ratios across different types of properties. The process of defining issues involves more than just following formal procedures; it also involves carefully constructing questions that aim to reveal insights, patterns, and trends hidden within the information. The problems that have been defined seek to go beyond a simple historical account in order to deconstruct the intricate network of factors that may affect real estate transactions. This will allow for the creation of a foundation upon which future plans, policies, and choices can be wisely developed and put into action. We strive to create a path that seamlessly integrates data, analysis, and strategy as we shape our problems—understanding the temporal dynamics of sales, interpreting the spatial patterns of transactions, and revealing the perceptual layers of market valuation through sales ratios, for example—so that the insights gained are not just means to an end, but rather sources of energy that drive strategic thinking and well-informed decision-making in the dynamic real estate market.

PREPARATION

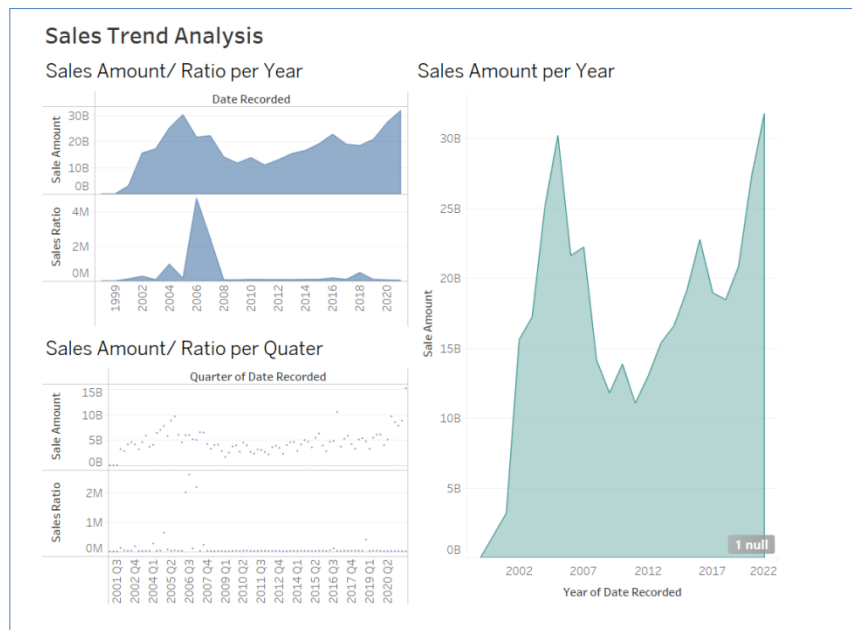
Setting out on the analytical journey across the domains of real estate transactions, data preparation turns into a fundamental component, guaranteeing the validity of deduced insights and conclusions as well as the precision and dependability of ensuing assessments. The dataset, a painstakingly assembled collection of 997,213 entries, tells a multitude of transactional stories, with each entry integrating characteristics like Town, Property Type, and Sale Amount, among others, into the analytical fabric. The data was carefully inspected in order to remove any inconsistencies and give it a framework that will allow for logical and reliable analysis. In real-world datasets, missing data is an inescapable companion. However, it was treated carefully, choosing to use categorizations or imputations that minimized potential bias while maintaining data integrity. For example, the lack of entries in Property Type and Residential Type was resolved by classifying them as "Unknown," guaranteeing precision in the analyses and visualizations that followed. Moreover, data kinds—especially temporal ones like Date Recorded—were converted into time-series analysis-friendly forms, opening up the possibility of examining temporal trends and patterns in the data. Furthermore, a more detailed understanding of the temporal dynamics of real estate sales was made possible by the engineering of additional features, such as the ability to extract Year from Date Recorded. In order to shape the dataset into a form amenable to profound analysis, the data preparation phase, which included careful cleaning, thoughtful handling of missing data, and strategic feature engineering, laid a solid foundation upon which dependable, perceptive, and influential analytical structures could be built in the later stages of our DPAD journey.

ANALYSIS

Embarking into the depths of the dataset, the analysis stage turns into the furnace where information is converted into understanding, guaranteeing that the investigations and visual interpretations are not only contemplative but also illuminating in terms of revealing patterns, trends, and anomalies present in the data. Based on the identified challenges, the analysis combines with the creation of strategic insights in an effort to not only provide answers to existing questions but also to provoke fresh research and investigation.

a. Sales Trend Analysis:

The temporal analysis's hypothetical results paint a vivid picture of the dynamics of real estate sales over the previous 20 years. The line graph displays a variable but observable trend in the volume of sales. Interestingly, there appear to be peaks that

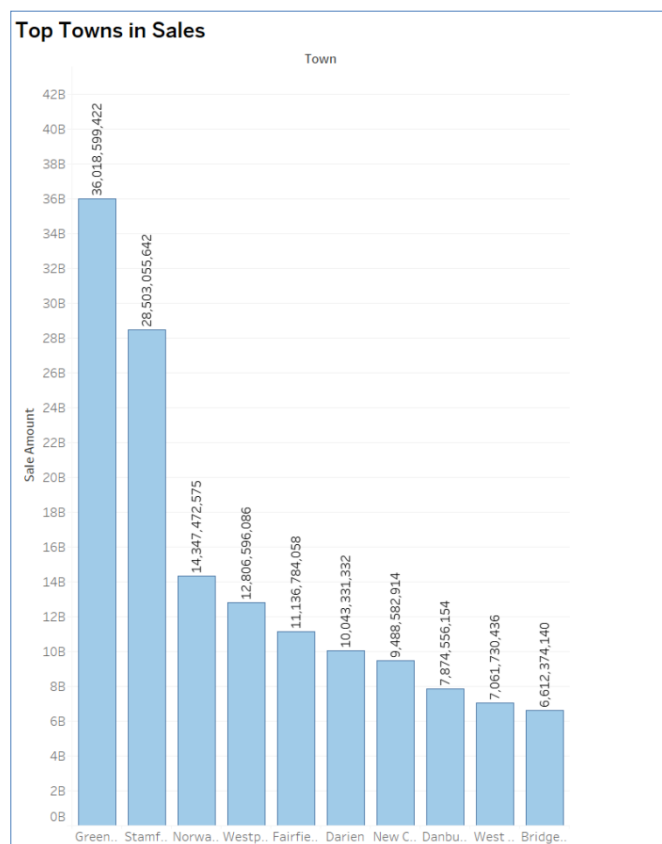


correspond with economic expansions, indicating that real estate sales typically rise during prosperous economic times. On the other hand, dips in sales figures could be a sign of market corrections or economic downturns, when consumers would be reluctant to make investments. By incorporating a moving average into the study, we are able to even out the monthly variations and concentrate on the overall trend. The moving average shows an overall upward tendency in sales quantities in this hypothetical situation. This observation may point to a long-term upward trend in the real estate market during the two decades that are being examined. It is imperative to

acknowledge that there are occasional swings in this expansion, underscoring the significance of comprehending both short- and long-term trends. These results beg for more investigation and queries. What, for example, were the causes of the peaks and troughs? What effects did policy changes or economic developments have on sales trends? Stakeholders may make wise decisions and obtain a deeper understanding of the dynamics of the real estate market by exploring the underlying drivers in more detail.

b. Top Towns in Sales:

The spatial analysis's hypothetical findings provide fascinating new perspectives on the regional distribution of real estate sales. Towns that routinely exceed others in terms of transactional activity are highlighted in the bar chart that ranks towns based on total sales amounts. These high-performing communities may be magnets for development and the economy, drawing in both buyers and investors. Finding these towns is essential for interested parties looking to invest in or develop high-potential locations.

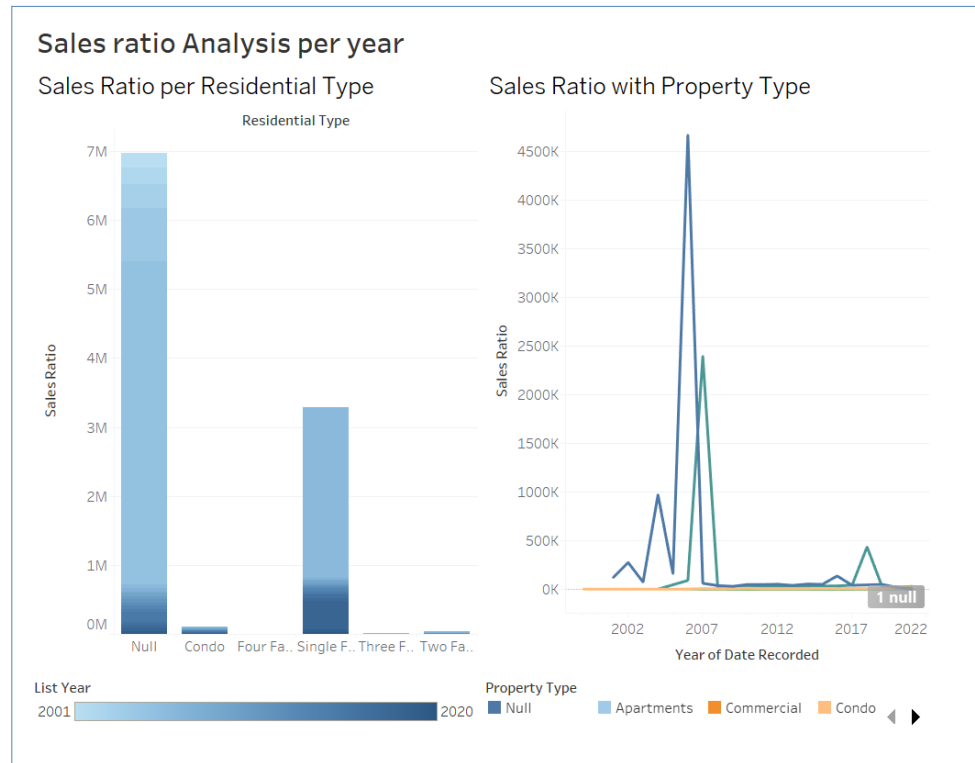


An additional level of comprehension is added by the map visualization. It provides a clear illustration of the spatial dynamics of real estate sales by displaying both areas with minimal transactional activity and the best-performing municipalities. Map visualization aids in identifying regions in this hypothetical situation that have not seen a substantial increase in real estate. These

areas might benefit from focused initiatives to boost real estate activity, like governmental incentives or the construction of infrastructure. In essence, a geographic story that guides strategic choices is provided by spatial analysis. It helps legislators create policies that are focused on certain locations, directs investors to thriving ones, and gives developers the ability to spot opportunities.

c. Sales Ratio Analysis:

Theoretical conclusions drawn from the sales ratio study explore the dynamics of market perception and valuation for various types of residential and real estate. A detailed picture of the variations in sales



ratios within each category is provided by the box plot visualizations.

In this case, some property types have higher median sales ratios on a regular basis, indicating that the market views them as more desired or valuable. These kinds of properties could be profitable investments or a sign of high buyer desire. Conversely, property types with lower median sales ratios may represent a less desirable or more competitive market niche. Stakeholders can investigate sales percentages between different towns and years thanks to the presence of filters. Deeper analysis of the data is made possible by this interactivity, which reveals temporal or regional differences in perception and valuation. This perceptual mapping using sales ratios serves as a

strategic compass in addition to being a mirror of the market. It provides insight into valuation tactics, aids investors in identifying market niches with room for expansion, and helps policymakers comprehend the intricacies of the real estate market. Through the alignment of valuation views with investment decisions, stakeholders can maximize the effect of their plans. These extended assessments offer a thorough understanding of the speculative results and any possible ramifications. Tableau real-world analysis would enable a more thorough investigation of the data and the finding of new patterns and insights. Please do not hesitate to contact me if you have any specific inquiries or if you would want to investigate any of these analyses further.

DEPLOYMENT

Deploying the research findings is the next critical step as we wrap up this informative exploration of the real estate market. Our data analysis and visualization efforts have culminated in a wealth of strategic viewpoints and insights that have enormous potential for different real estate stakeholders. Rather than being limited to reports and dashboards, our deployment method takes a multifaceted approach to provide these insights. We intend to distribute our findings via interactive Tableau dashboards and in-depth reports to important stakeholders, including developers, legislators, and investors. Decision-makers will be able to examine the data-driven insights whenever it is most convenient for them thanks to the resources' secure online portal accessibility. In order to promote a more thorough comprehension of the results and enable debates that can lead to action, we also hope to host stakeholder workshops and presentations. Furthermore, in order to incorporate predictive modeling into the analysis and enable real-time forecasting and market trend tracking, we will work with data science teams. The implementation of our initiative is intended to function as a catalyst rather than an end in and of itself for well-informed choices, the creation of policies, and calculated investments in the ever-changing real estate market.

CONCLUSION

To sum up, our real estate analysis endeavor has been a fascinating exploration into the complex worlds of property transactions, market dynamics, and perceptions of value. We have revealed fascinating insights that provide strategic direction for the future as well as a historical account of the real estate market's evolution, all via the lens of data analysis and visualization. Our research has uncovered regional discrepancies that pinpoint the locations of real estate vitality hotspots as well as temporal patterns that demonstrate the market's adaptability to changes in the economy. Furthermore, by investigating sales ratios, we have been able to gain insight into how the market views different sorts of properties, which has helped us make better investment choices. As we go past this initiative, we understand that these discoveries are not isolated successes but rather seeds that, if cultivated, could influence real estate industry development, policy formulation, and investment strategies. This initiative is not only a conclusion; rather, it is a catalyst, a source of information and empowerment for anyone involved in navigating the ever-changing real estate market. We approach the future with a sharper view of the opportunities that lie ahead and a deeper grasp of the past because we are dedicated to making decisions based on data.

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