

A study of home affordability by county for the state of New Jersey



DEV-10 DATA CAPSTONE PRESENTATION

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WHAT IS CONSIDERED AFFORDABLE?

Can a household making the median income for their area,
buy a median priced home for their area,
with a mortgage payment that does not exceed 25% of their
income?

FACTORS EXAMINED

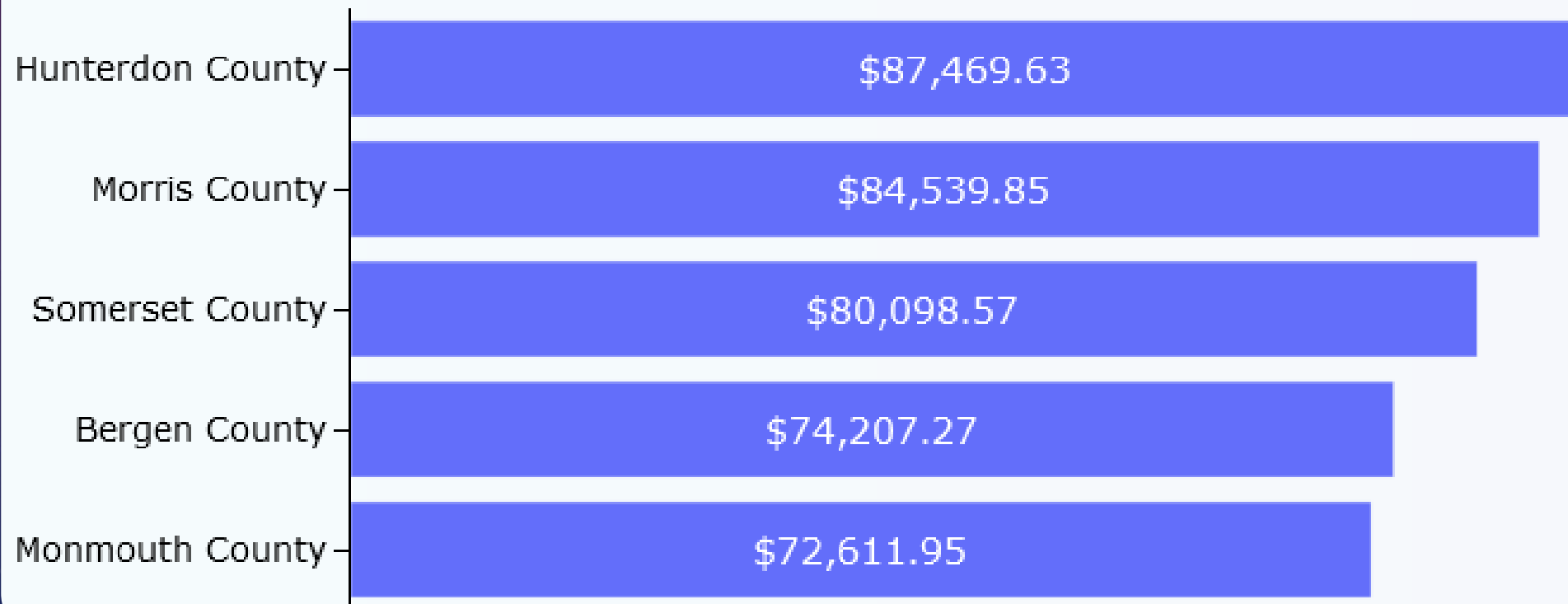
- Median Household Income
- Median Home Prices
- Amount of New Home Construction
- Mortgage Rates

EXPLORATORY QUESTIONS:

- What counties have the highest median income on average?
- In what counties is home ownership most and least affordable?
- During which years has home ownership been most and least affordable?
- How has the median household income changed over the years when adjusted for inflation?
- What age groups are best situated to buy a home in different counties based solely on income, and how has this changed over the years?

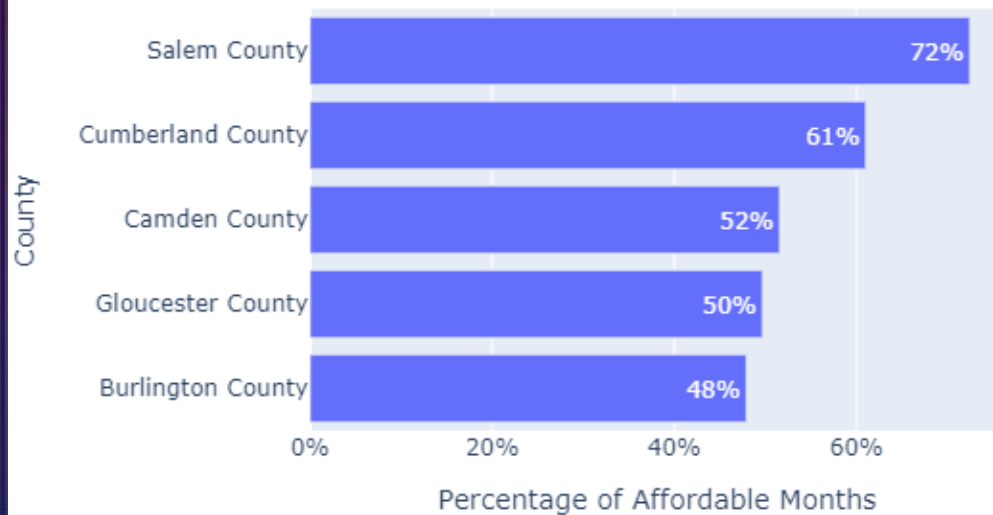
COUNTIES WITH HIGHEST MEDIAN INCOME

Counties with Highest Overall Average Median Income

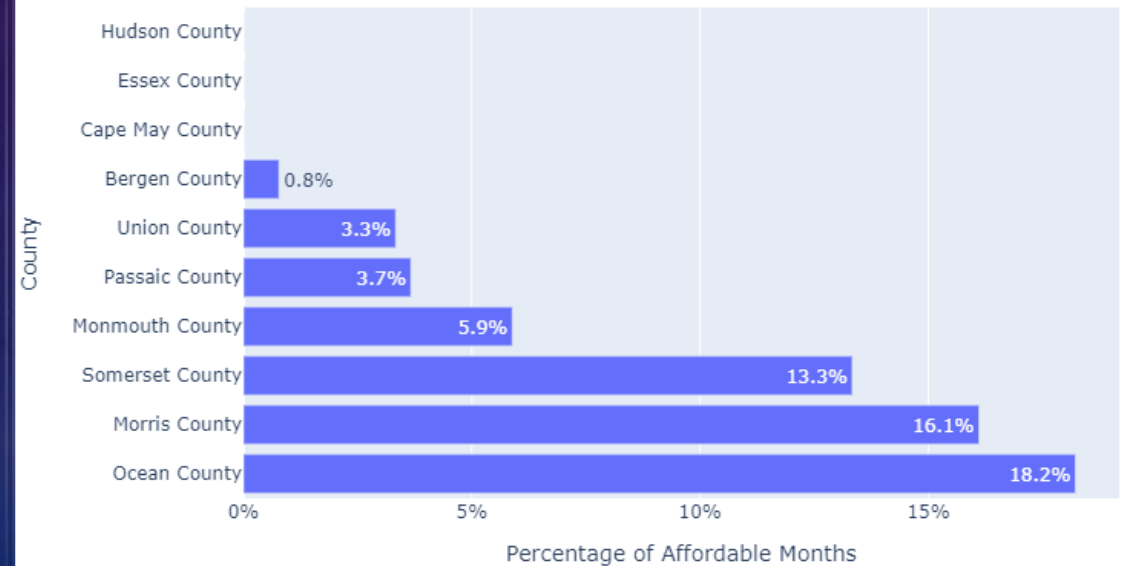


MOST AND LEAST AFFORDABLE COUNTIES ON AVERAGE

Five Most Affordable Counties in New Jersey

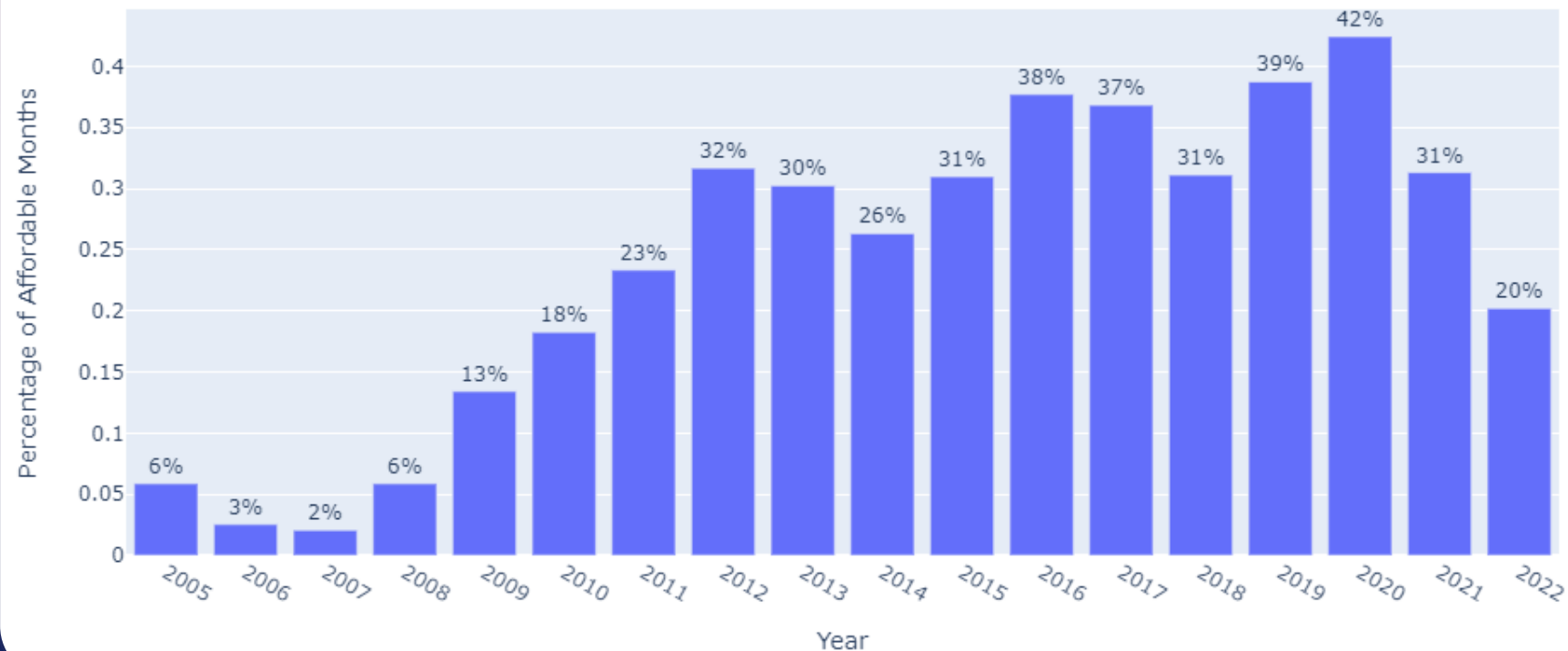


Ten Least Affordable Counties in New Jersey



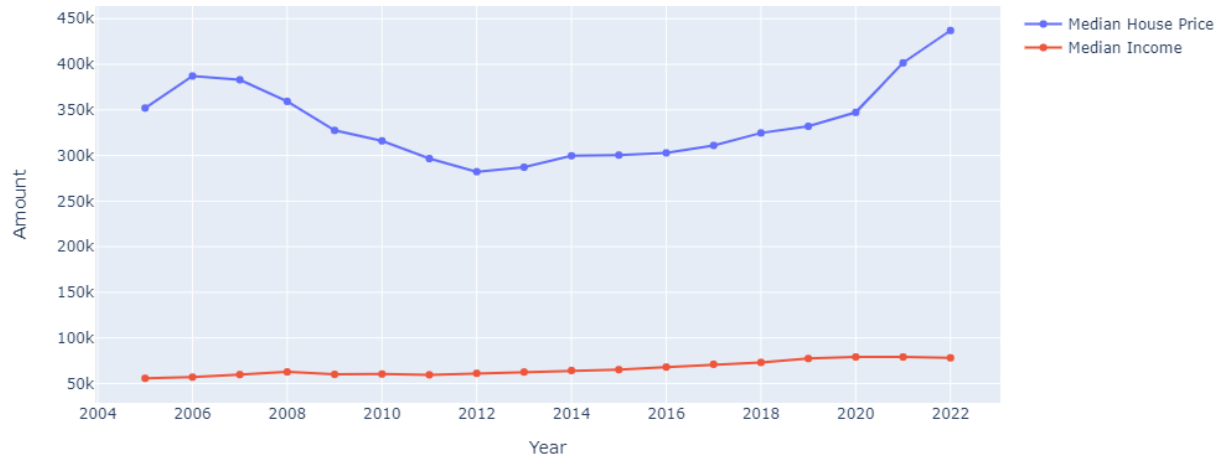
YEARS WITH MOST AND LEAST HOME AFFORDABILITY

Percentage of Affordable Months by Year

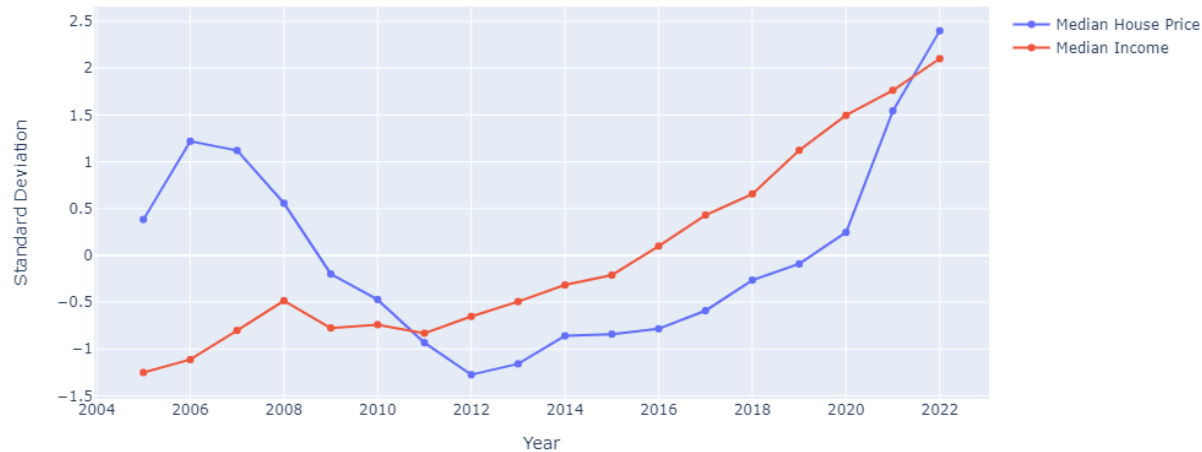


MEDIAN HOUSEHOLD INCOME VS. MEDIAN HOUSE PRICE

Median House Price and Income over Time

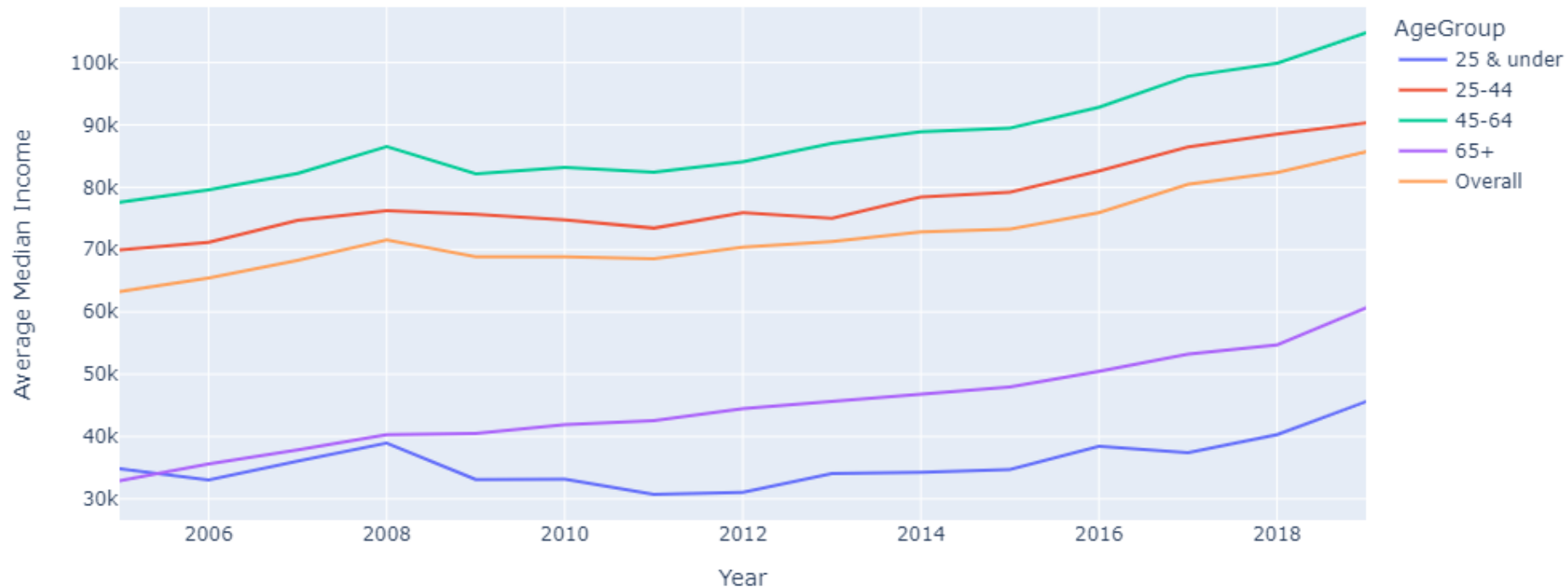


Median House Price and Income over Time Standardized



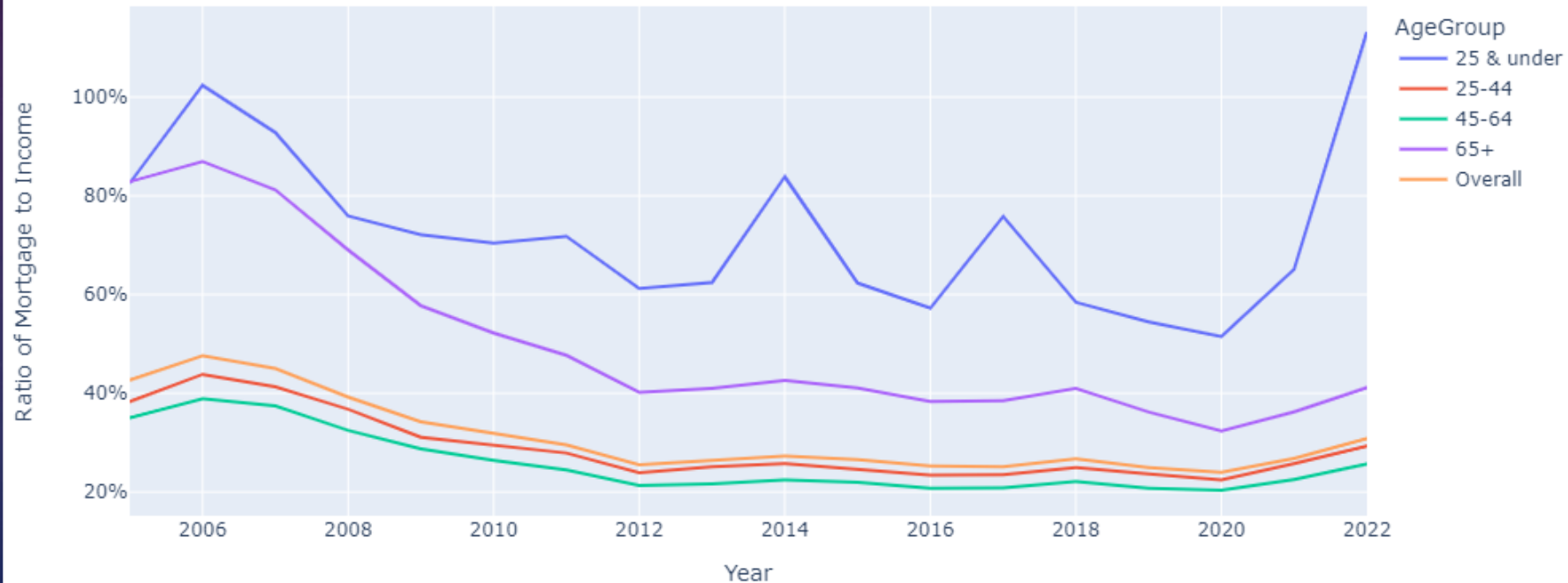
HOW HAS MEDIAN HOUSEHOLD INCOME CHANGED?

Median Income by Age Group over Time

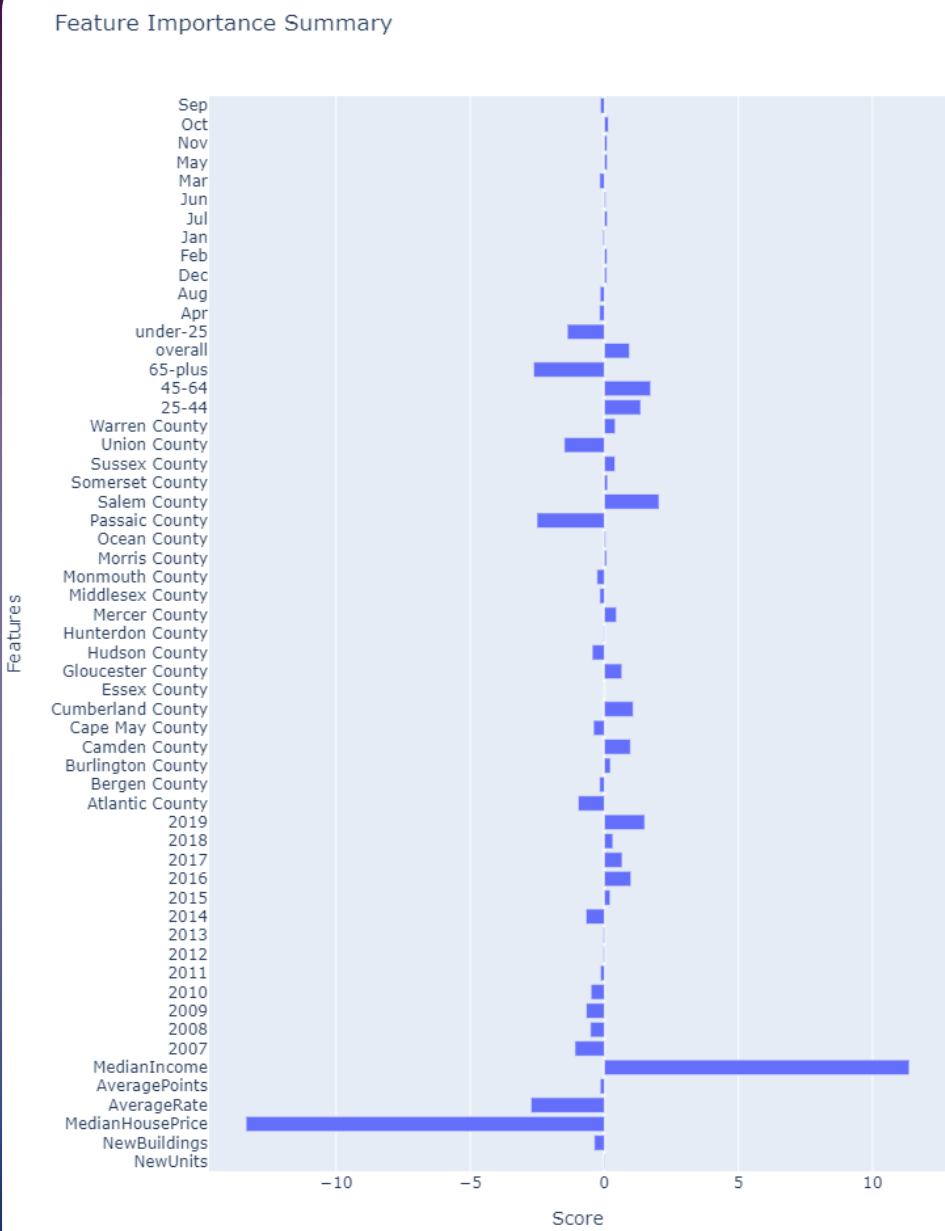


WHAT AGE GROUPS ARE MOST ABLE TO AFFORD A HOME?

Affordability by Age Group over Time



LOGISTIC REGRESSION MODEL



ARIMA - AUTOREGRESSIVE INTEGRATED MOVING AVERAGE

- AR – Autoregressive
Dependent variable relies on its past values, lagged observations
- I – Integrated
Predict the difference of the series from one time step to the next time step
- MA – Moving Average
Measures errors from previous predictions to make better future ones
- Parameters (p,d,q)
 - p – lag order, the number of lagged observations
 - d – degree of differencing
 - q – order of moving average

ARIMA MODEL

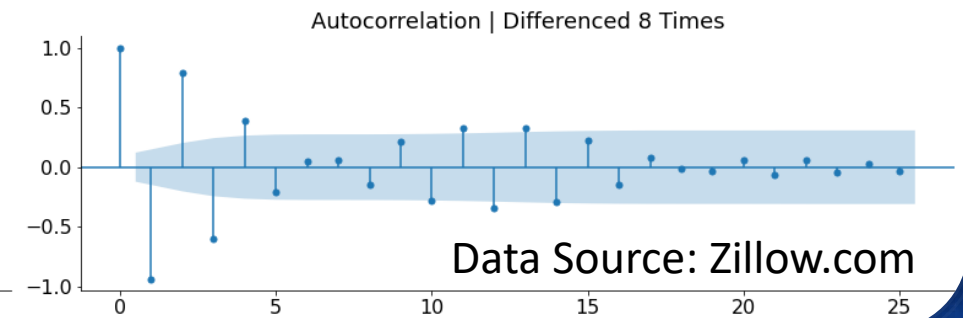
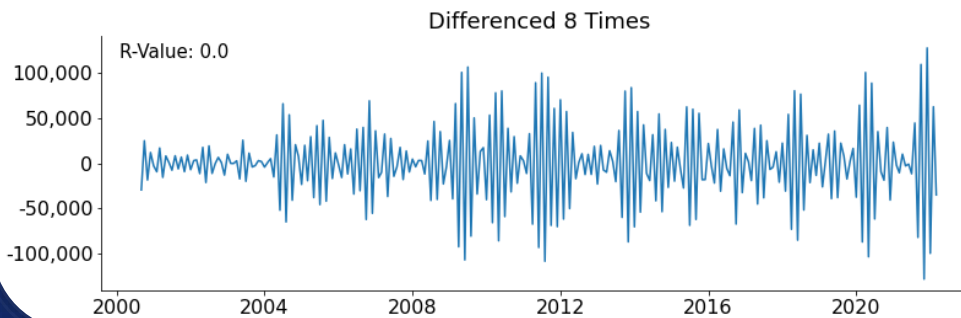
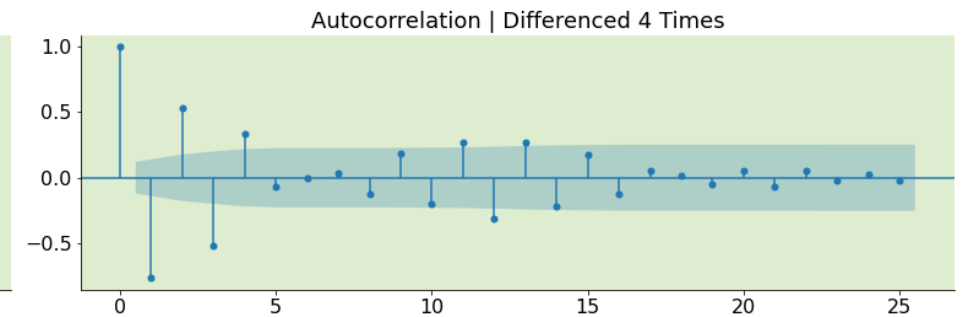
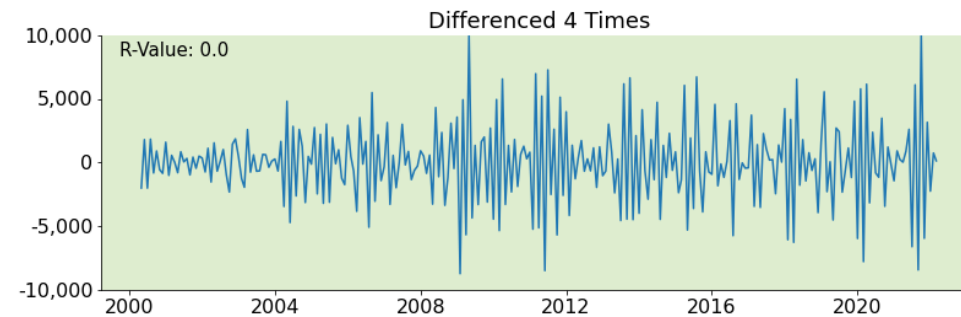
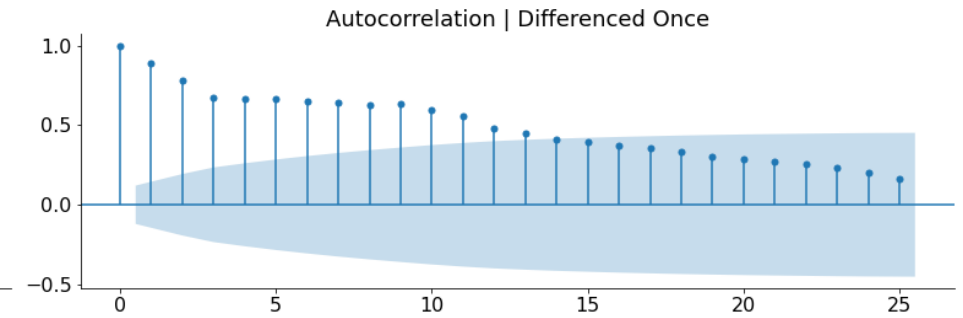
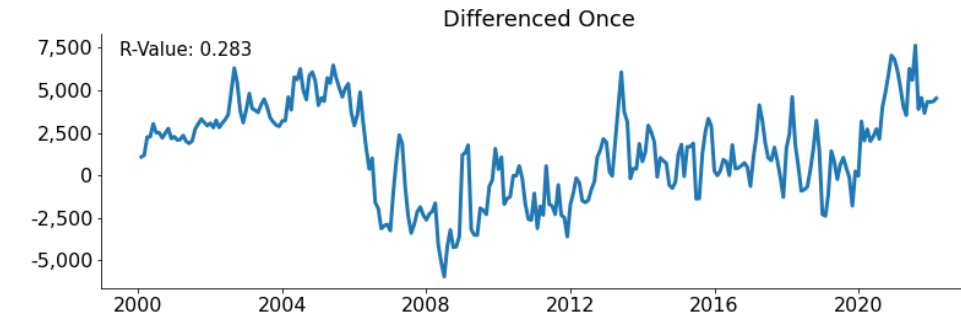
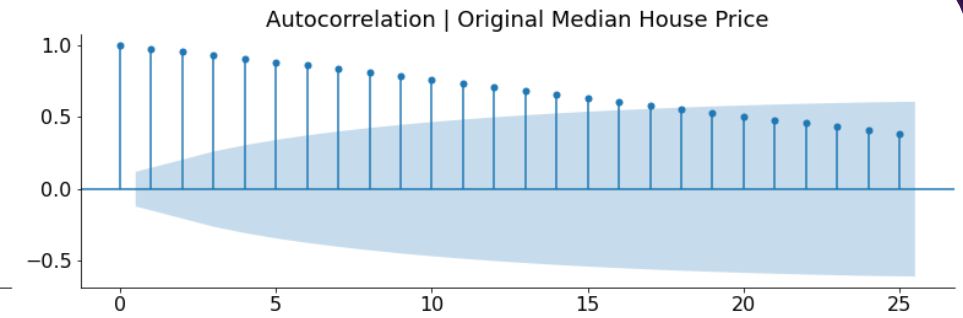
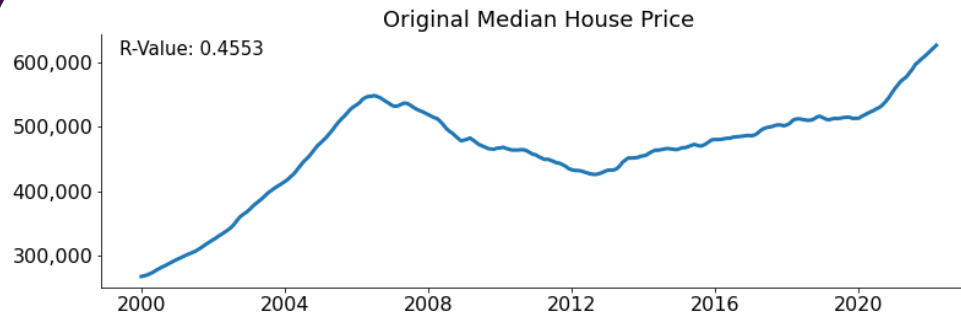
Ensure Stationarity:

- Stationarity is Achieved at 4 orders of Differencing

Next Steps:

- Find Order of Auto Regressive Term
- Find Order of Moving Average

Grid Search to find the ideal remaining parameters.



Data Source: Zillow.com

DATA SOURCES

- New construction building permit data from the U.S. Census:
 - U.S. Census Economic Surveys Response. Index of /econ/BPS/county. (n.d.). Retrieved May 6, 2022, from <https://www2.census.gov/econ/bps/County/>
- Median house prices from Zillow:
 - Housing Data. Zillow Research. (2021, March 25). Retrieved May 6, 2022, from <https://www.zillow.com/research/data/>
- Mortgage rates from Freddie Mac:
 - 30 Year Fixed Rate Mortgages since 1971. Retrieved May 11, 2022 from: <https://www.freddiemac.com/pmms/pmms30>
- Median income data from US Census:
 - Bureau, U. S. C. (2021, November 23). American Community survey 1-year data (2005-2020). Census.gov. Retrieved May 6, 2022, from <https://www.census.gov/data/developers/data-sets/acs-1year.html>.<https://api.census.gov/data/<year>/acs/acs1/variables.html>

DASHBOARD PRESENTATION

