Motivation

The relationship between personal income and the home price index provides great insight on the future of housing market performance, future savings preferences, and community development. Statistical values such as the correlation and cointegration between personal income and home price index can measure if the two variables are moving together as well as if the spread between the two time series is maintaining its distance. If we are able to show the spread between an individual's income and the average house cost is not consistent we can test to determine if convergent periods between income and home prices proceed to periods where personal income and home prices diverge. This could help prospective home buyers determine if they should continue to rent or apply for a mortgage. Additionally, it can have overarching effects on the market as a whole as excess spending could be reduced in response to home prices that outpace personal income. Buyers could also look to compare communities where available homes are located to compare markets that may be more susceptible for future instability.

Research Overview

The paper by Joshua Gallin investigated the relationship between personal income and home prices in an attempt to determine if they were cointegrated. Using a variety of tests he commonly came to the conclusion that the two variables were not cointegrated suggesting that the error-correction models commonly used for housing markets would not be accurate.

The paper by Shuchang Yu examines the relationship between housing prices and personal income and uses that to explore how consumer spending responds to changes in the two variables. Ultimately, Yu determined that consumer spending had a much stronger relationship to income than housing prices. Inferences from this observation could be made involving the price sensitivity of individuals to housing prices compared to their sensitivity to everyday purchased goods.
https://www.federalreserve.gov/pubs/feds/2003/200317/200317pap.pdf

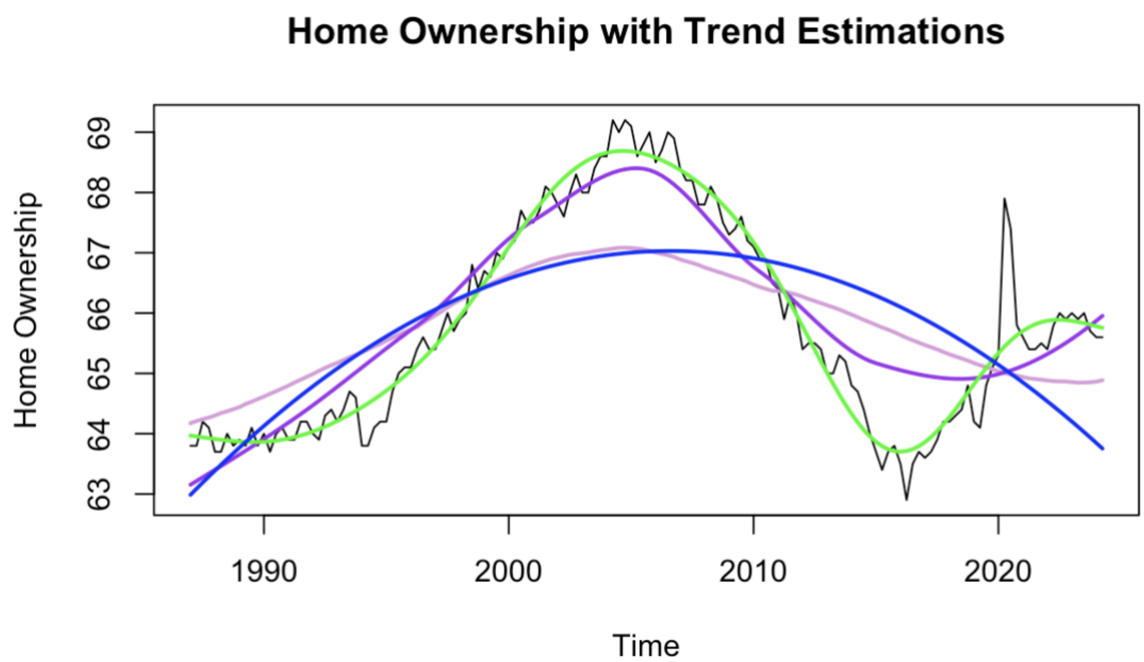
https://www.researchgate.net/publication/387442944_The_Relationship_between_Income_and_House_Prices_on_People's_Consumption

Exploratory Data Analysis

Initial analysis was done cleaning, normalizing, and synchronizing data for both personal income and housing prices. These plots were then compared to plots of numerous other variables such as lumbar prices, interest rates, and presidential incumbent party to observe common points of changing trend or variance. Tests to determine the stationarity of the home price index and personal income time series' were done including observing the trend and seasonal components of each

Planned Analysis

Direct correlation tests can be done between personal income and the home price index via both linear correlation tests as well as cross correlation functions, allowing for comparing the time series at various lags. The cointegration of the two time series can be tested to determine if the spread of the two variables remains constant. If it is not we can use tests such as the Granger causality test or vector autoregression to determine if one time series can help predict the other.


Home Ownership with Trend Estimations
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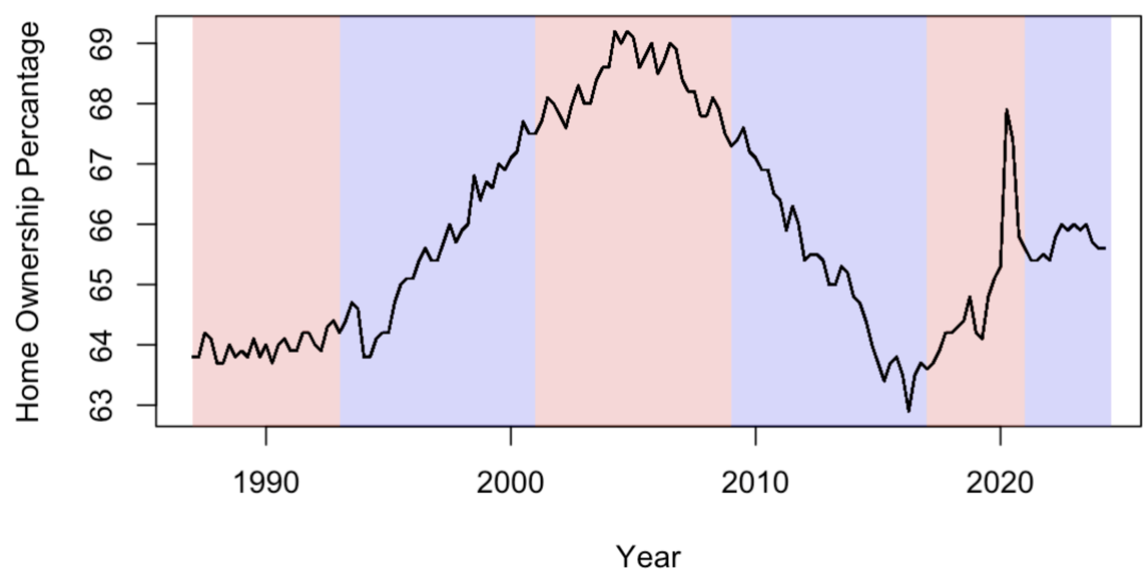
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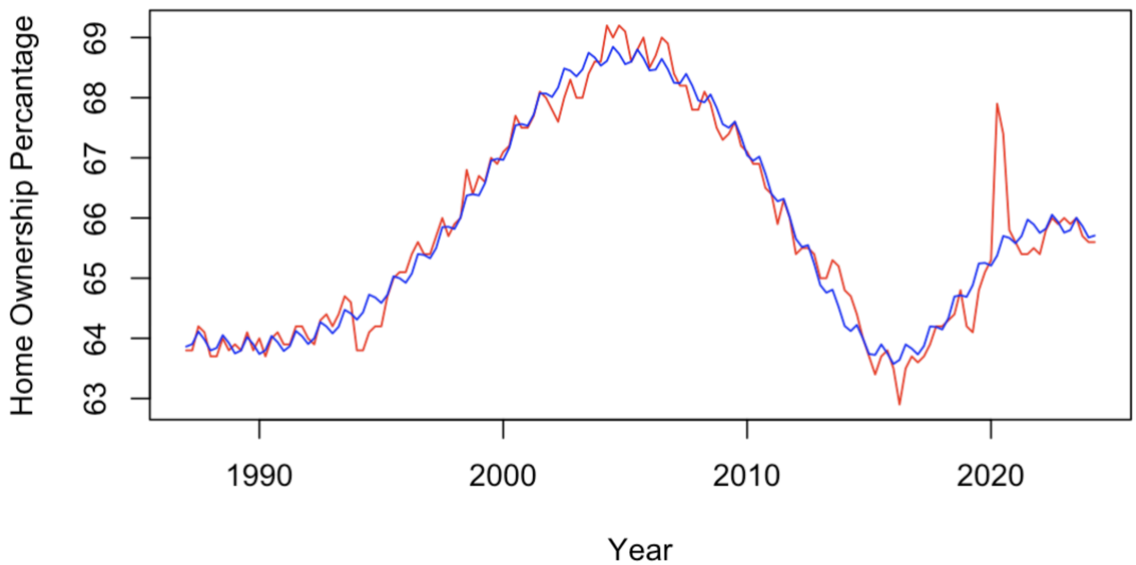
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