Abstract

House Price Index (HPI) is a broad economic measure of the movement of single-family house prices in the United States and it plays an essential role in capturing the dynamics in the real estate market. From the historical trend of the House Price Index, the property bubble and its burst can be observed from 2005 to 2010. Investors are now more concerned about whether we will experience similar housing bubbles shortly and, even more precisely, when is the turning point. However, in previous studies, market difference was a main obstacle to establish a general model. In this project, we examine markets separately and try to understand HPI in city level.

Study Goal

In this project, we try to fully understand the mechanism of housing bubbles by focusing on affordability and credit availability. By decomposing the affordability into purchase affordability and repayment affordability, we will show the relationship between housing price, interest rate, and householder’s income. Combined with expectation theory, we try to explain bubble accumulation and its final burst considering people’s psychological factors. We try to analyze the trend of housing prices and potential bubbles embedded in three different approaches: affordability and credit ability as a basic benchmark, expectation theory to incorporate psychological effects and the residual income perspective to dig deeper into household-wise affordability.

Affordability Decomposition

Residual Income Approach

The key idea of this approach is to analyze the household balance sheet, namely the income, taxes, and minimal non-housing expenditures. We can derive the maximal housing expenditure, which is the housing affordability, by subtracting the minimal non-housing expenditures and taxes from income. This method is by nature logically sound and can produce precise estimations for different types of households.

Future Work

- Data Frequency: A high-quality dataset with better granularity may improve accuracy.
- Distribution Estimation: The dataset only includes 10-year period for housing price distribution, so a better estimation for other years is required.
- Regional Test: More regions with different features could be tested.
- Psychological Effects: We assume adaptive expectation in the market; however, adaptive, naive and rational expectation may exist at the same time. Future research could also extend the model to incorporate multi-period analysis.

Through preliminary investigations, most counties display similar phenomenon where the household type “1 adult, has child” starts with extremely low maximal housing affordability and keeps declining, showing that on average this type of household is even unable to afford basic non-housing expenditure and has nearly no housing affordability.

Although the method is theoretically promising, there are tremendous difficulties in realization including securing suitable datasets, calculating taxes, and integrating different datasets together.