

# Application of wavelet decomposition and Markov switching model to detect housing boom-bust cycles

Keyvan Shahab Lavasani \* , Hossein Abbasinejad

1. Phd in Economics, Department of Economics, University of Tehran, Kargar Amirabad, Tehran, Iran, University of Tehran (Corresponding Author), Email: [keyvanshabab@ut.ac.ir](mailto:keyvanshabab@ut.ac.ir)
2. Prof. in Economics, Department of Economics, University of Tehran, Kargar Amirabad, Tehran, Iran, University of Tehran, , Email: [habasi@ut.ac.ir](mailto:habasi@ut.ac.ir)

## Abstract

Housing markets, due to certain distinctive features, such as rigid supply, infrequent trades, opaqueness, short-term financing for construction together with long-term financing for occupancy, are intrinsically prone to boom-bust cycles. While empirical studies documenting the cyclical behavior of housing market developments abound, there is a relative scarcity of theoretical models of real estate cycles. Most of these rely on supply rigidity and uncertainty about long-term returns on housing to generate strong and persistent cyclical movements. Generally, busts in housing prices lead to their booms. A periodically cyclical fluctuation has occurred to the Iranian housing market in the long run, e.g., nearly every 6 years. Housing wealth is a large component of total wealth and plays an important role in aggregate business cycles. Moreover, business cycles, financial stability, and household welfare are significantly influenced by the movements occurred in house prices.

In this study, at first, we extract low frequency housing price cycles by multilevel of wavelet decomposition and then we apply the housing price cycles into a Markov switching model in order to analysis housing boom-bust cycles. Finally, to analyze the boom and bust periods in the housing market, a housing price cycle was employed to a Markov-switching model from wavelet decomposition in this research. To identify the peaks and troughs, the inferences of the filtered and smoothed probabilities were utilized.

**Key words:** Wavelet decomposition, Housing market, Housing cycles, Housing Boom, Housing Bust, Markov switching model

## 1. Introduction

A boom and bust cycle is a process of housing market expansion and contraction that occurs repeatedly. Based on Iranian cultural teachings housing market is one of the most important markets. It is almost the first investment priority. This market is often in the first place of size and transaction among other markets. The share of income spent on housing expenditure is