Quantile Regression and the Decomposition of House Price Distribution

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Paper Abstract:
Following the global financial crisis, the importance of developing property price indexes as part of official statistics has been recognized, and in light of this, in 2014, the U.N., International Monetary Fund (IMF), BIS, OECD, and World Bank jointly published the *Handbook on Residential Property Price Indexes.* Since then, the development of housing price indexes has been progressing. In general, however, the purpose of these indexes is to observe changes in prices over time, which means that even when changes in price by country or region are observable, it is not possible to compare differences in price level. This paper proposes a new housing price index estimation method that enables temporal trends in housing prices by city/region and cross-sectional price levels to be compared at the same time. This paper estimated a housing price index focusing on major cities in Japan during the period of the 1980s real estate bubble and subsequent collapse. The real estate bubble that occurred in Japan in the 1980s has been called the greatest bubble of the twentieth century. It warrants the question thus, how did housing prices fluctuate during the bubble and the quarter-century following its collapse? In order to answer this question, this paper estimated housing price indexes by region and clarified the spatial housing price fluctuation process. When attempting to analyze fluctuations in housing prices by region, it is necessary to capture the price levels or price distribution at the same time as the price fluctuations. Therefore, using quantile regression, we first developed a method that enables the price distribution and price index to be estimated simultaneously. Second, using the method we developed and focusing on Tokyo, we identified what factors caused changes in housing prices. Third, we estimated the price indexes and price distributions for six leading Japanese cities and identified the price fluctuation structure that existed in each region during the bubble formation period, bubble collapse period, and subsequent quartercentury.