Economic Modelling 46 (2015) 376–383

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Bubble or riddle? An asset-pricing approach evaluation on China's housing market☆

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ARTICLE INFO

Article history:
Accepted 6 February 2015
Available online 25 February 2015

Keywords:
House prices
Asset pricing approach
Rent-to-price ratio

ABSTRACT

Rapid house price growth and high price-to-income ratio in major Chinese cities have aroused a hot debate on whether there is an asset bubble in China's residential housing market. To investigate this question, we employ an equilibrium asset-pricing approach, which suggests a non-arbitrage condition on the rent-to-price ratio. This ratio should be equal to the difference between the user cost of housing capital and the expected appreciation in house prices. Using a novel micro-level data set on pair-wise matched price-to-rent ratio collected in the fourth quarter of 2013, and forecasting the expected house price appreciation based on fundamental factors, our empirical exercises do not suggest the existence of a house price bubble at the national level. However, this conclusion highly depends on the expected income growth rate and may not apply to individual markets.

1. Introduction

In the past decade China has been experiencing a surge of house prices at an unprecedented rate. Fig. 1 plots the average residential house prices in the 35 major Chinese cities. These cities represent all municipalities, provincial capital cities and quasi-provincial capital cities in China, whose house prices have been closely watched by policy makers, researchers and investors. On average their residential house prices have steadily increased from 2426 yuan/m^2 in 2003 to 7718 yuan/m^2 in 2012. This implies a more than tripled property value in 9 years, or a 13.7% nominal compound annual growth rate. During the same period, the average CPI of these cities only rose by 30%. Fig. 2 depicts China's average residential house price-to-income ratio, a common measure of housing affordability. At the national level, this ratio has sharply increased from 6.6 in 2003 to 8.1 in 2009, and gradually declined to 7.3 in 2013 after a series of house price regulations. The 35 major Chinese cities witness an even higher price-to-income ratio, which reached 8.5 in 2013 (E-house China, 2014). By contrast, the price-to-income ratio was around 4 in the US, 5 in the UK and 6 in Australia right before the recent financial crisis (Reserve Bank of Australia, 2008). Such rampant house price growth and unusually high price-to-income ratio have aroused great interest and concern on whether China has an asset bubble in its housing market.

To assess whether the house prices are too high or too low, an equilibrium asset-pricing approach has been offered by the housing literature. According to this approach, neither accelerating house price growth nor the remarkable price level itself is the intrinsic sign of a bubble, let alone the anecdotal price fluctuations in a single property or casual observations on the housing markets. In contrast, the golden rule of the evaluation boils down to a non-arbitrage condition on the rent-to-price ratio, which is equal to the difference between the user cost of housing capital and the expected appreciation in house prices at equilibrium. Himmelberg et al. (2005) is one leading example in applying this approach to assessing the house prices in the US.

This paper aims to address whether there is a house price bubble in China using this asset-pricing approach. We argue that the expected house price appreciation, instead of high house price growth or price-to-income ratio, is central to the debate on the existence of a house price bubble. There are, however, three significant challenges in implementing the approach to China. First, there are no readily available data on rent-to-price ratio that have properly controlled for house characteristics. Second, little is known on each component in the user cost of housing capital for a nascent market like China. Last and most importantly, although economic theory provides useful suggestions on the fundamental factors that determine the house prices, there is no prior information on, either their own expected growth rates, or their elasticities in house price growth accounting.

This paper contributes to the literature by addressing all these issues in a systematic way. We construct a set of pair-wise matched rent-to-price ratio across 60 large and medium-size Chinese cities using micro-level data. The actual rent-to-price ratio collected in the fourth quarter of 2013 has an average of 3.21%. Using fundamental factors to forecast the expected house price appreciation, our calculated equilibrium rent-to-price ratio as a whole ranges from 2.85% to 3.39%, conditional on the

☆ The authors would like to thank the editors Stephen George Hall, Paresh Narayan and an anonymous referee for constructive comments and suggestions. We are grateful to Ming Lu for many useful discussions at various stages of this paper. We also thank Yew-Kwang Ng and Meng Li for helpful comments; and Mingyang Guan, Yongjian Song and Yu Zhou for their excellent research assistance. Financial support from the New Silk Road Research Grant M4080405 at Nanyang Technological University is gratefully acknowledged.

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http://dx.doi.org/10.1016/j.econmod.2015.02.004
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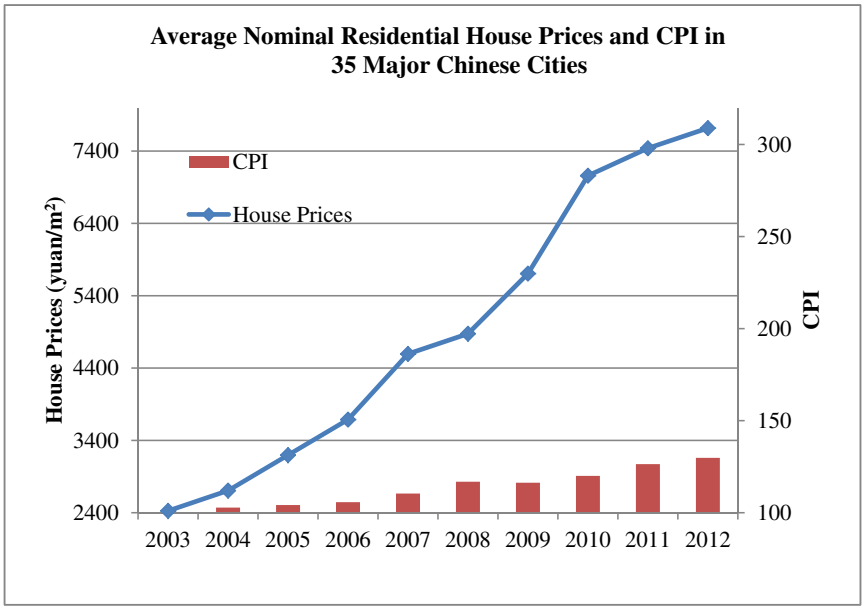


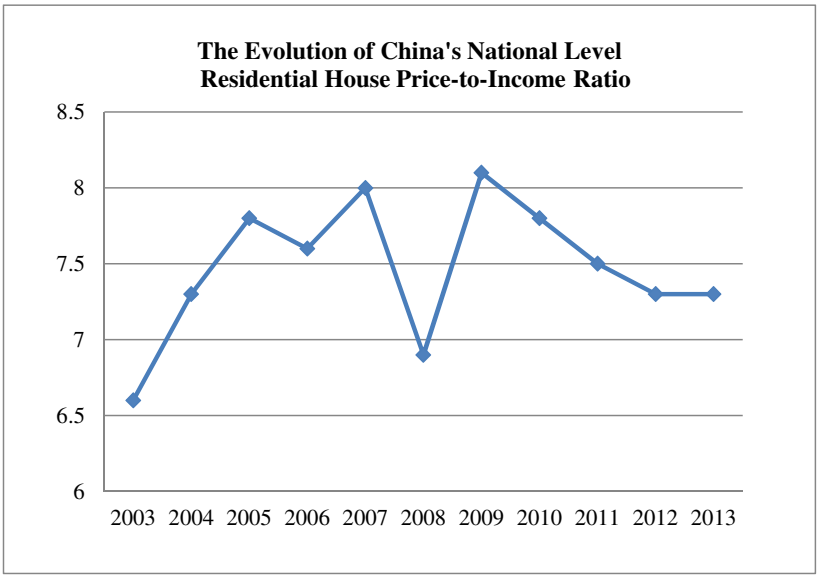
Notes: Data on house prices are from the China Real Estate Statistic Book 2004-2013.
Data on CPI are from the China Statistics Yearbook of Regional Economy 2004-2013.

Fig. 1. Average nominal residential house prices and CPI in 35 major Chinese cities. Notes: Data on house prices are from the China Real Estate Statistic Book 2004–2013. Data on CPI are from the China Statistics Yearbook of Regional Economy 2004–2013.

public information available at the end of 2013. Thus, our empirical exercises do not indicate that the residential houses are systematically overpriced at the national level.

Two important insights also arise from our analyses. First, cities with different expected house price inflation could have very different rent-to-price ratio. It is therefore impossible to conclude whether there is a house price bubble in a specific market without taking into account its prospect in income, population and housing supply. Second, even at the aggregate level, the evaluation on whether there is a house price bubble highly hinges on the expected growth rate of the fundamentals, especially income, in the case of current China.

We then produce two sets of information which are particularly useful in addressing the ongoing hot debate. The first set includes the cutoff values of the expected growth rate of house prices, disposable income



Notes: Data are cited from E-house China (2014). The ratio is calculated as average house price per m^2 × urban house size per person / urban disposable income per capita.

Fig. 2. The evolution of China's national level residential house price-to-income ratio. Notes: Data are cited from E-house China (2014). The ratio is calculated as average house price per m^2 × urban house size per person/urban disposable income per capita.