Interaction among real estate properties in China using three submarket panels

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ABSTRACT

Although the heterogeneity of real estate property submarkets has been discussed in a number of studies, little is known about their actual relationship. The purpose of this work is therefore to explore the dynamic interaction among the residential, office and retail markets in China using data from six Chinese mega cities for the period from 2003 to 2014 to create three submarket panels. Through application of the panel co-integration test, it is shown that there is no long-run equilibrium among them, namely, the three property submarkets are not all driven by common fundamentals. More importantly, the panel causality test of the three submarket panel returns reveals that changes in the residential market lead to changes in the commercial market. We may thus conclude that China's authorities should place special emphasis on the residential market in order to restrain today's rising real estate prices.

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1. Introduction

It is well-known that China with 1990's real estate reform (Chen, Guo, & Wu, 2011) is now experiencing an unprecedented real estate frenzy throughout all cities, even larger than the real estate boom in the U.S., despite the fact that the authorities have repeatedly demonstrated their desire to reduce the pressure of continuously increasing real estate prices. Clearly, an in-depth sight into real estate study is especially important in the case of China's economy.

In addition, although a considerable number of studies regarding the spillover effects in real estate have been made, especially the "ripple" effect in the housing market across cities, regions, or smaller geographical units, the interaction among different types of property with different characteristics is another critical point required to obtain a better understanding of the real estate market in our opinions. Brigham (1965) defined that property as an estate ranging from a vacant piece of land to an area occupied by residential or commercial purposes. Real estate asset can be further divided into residential and commercial properties by categorizing them according to different uses. Unfortunately, little attention has been given to the relationship among these property submarkets (Kan et al., 2004). Gyourko and Linneman

(1988) have described residential and commercial assets as owner-occupied homes and income-producing properties, respectively. Institutional investors mostly choose to invest commercial property based on long-run and stable income or revenue. The movement of commercial properties is much more volatile than that of residential properties because the trend of commercial property always moves production and economic cycles together. In contrast, for residential properties, utility maximization of a buyer is based on the living need (Kwong & Leung, 2000). However, it is difficult to calculate utility or satisfaction based on an arbitrary feeling and emotion, which is often cited by myopia and irrational exuberance (Phillips, Wu, & Yu, 2011). This is why most studies have been devoted to analyzing the bubble of residential or housing prices (Black, Fraser, & Hoesli, 2006; Case & Shiller, 2003; Hui & Yue, 2006; Tsai & Peng, 2011; Wu, Gyourko, & Deng, 2012). Furthermore, in term of financing conditions, the maturity of loans is generally much longer in the residential market than for commercial asset; moreover, the higher loan-to-value ratios and lower interest rates that characterize the residential market reflect differences between two properties. Based on these factors, investment in commercial property must be appraised very fairly and carefully and there is therefore less speculative activity in commercial market than the housing market. From the above discussion, it is clear that residential and commercial properties have totally different characteristics.

More importantly, Gyourko (2009) proposed two critical

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arguments related to the concepts of equilibrium and disequilibrium in order to authentically depict manipulation of different types of property within the real estate market. The first theory, which is called the urban economic theory, emphasizes that all real estate property submarkets are driven by common economic fundamentals and thus prices for different types of real estate property should eventually come together. Another possibility arising from bubble or arbitrage theory is that the very low speed of adjustment in the real estate market, especially for residential property brings about a mismatch between the different subsectors. That is to say, the former relies on the viewpoint of equilibrium, at least the long run while the latter explains that there is a disequilibrium relation between residential and commercial markets due to the different rates of adjustment in these two properties. As far as the econometric approach is concerned, the outcome of cointegration test can correspond to the above two arguments: if there is a cointegration relation, it implies that there is long-run equilibrium among the three property submarkets. This result is inclined to support the viewpoint of equilibrium in urban economic theory. On the contrary, the viewpoint of disequilibrium from bubble theory is confirmed by no cointegration relation, namely, no long-run equilibrium among them. Panel cointegration tests can help us to evaluate the merits of possible reasons for interaction among different property submarkets.

In this paper, data for different cities covering the period from 2003 to 2014 are used to construct a new set of panel data for three different property submarkets. The panel data econometric approaches are then used to investigate the interrelationships among the three property submarkets through panel cointegration tests and panel causality tests. The estimation results show that there is no long-run equilibrium among the three property submarkets and hence according to first-differenced real estate prices, in the case of China, it is the residential market that leads to rising prices in the commercial markets. It can therefore be concluded that China's residential market deserves explicit emphasis in order to reduce the pressure of excessively high housing prices.

The remainder of this paper is organized as follows. Section 2 reviews some research on housing price diffusion, the heterogeneity of submarkets and their interaction. Section 3 provides a dynamic framework for the interaction among the three property submarkets and description of panel data econometrics. Section 4 describes the real estate price data from six mega cities in China based on three property submarkets along with the results of panel unit root tests. Section 5 applies the panel version for cointegration and causality tests to examine the relationship among the three property submarkets. The relevant economic implications based on the above estimation results are then discussed. Section 6 presents some general conclusions.

2. Literature review

The ripple effect is the most commonly used concept to explain spillover effects in the real estate literature. In fact, the ripple effect originally came from the study of regional housing prices in the UK from the south east region out to other regions (Alexander & Barrow, 1994; Drake, 1995; Giussani & Hadjimatheou, 1991; MacDonald & Taylor, 1993; Meen, 1996). Over the past few years, the ripple effect has been widely observed in housing markets in other countries such as Australia (Luo, Liu, & Picken, 2007); New Zealand (Shi, Young, & Hargreaves, 2009); Taiwan (Chien, 2010; Chen et al., 2011; Lee & Chien, 2011; Lee, Lee, & Lin, 2014); Malaysia (Lean & Smyth, 2013); the United States (Gupta & Miller, 2012; Yunus & Swanson, 2013); the Euro area (Gupta, Andre, & Gil-Alana, 2014) and China (Chiang, 2014; Liao, Zhao, & Lim, 2015; Ling & Hui, 2013). In other words, numerous studies have been devoted

to observing the spillover effects of housing prices across regions or cities.[1]

However, it has been established that different types of real estate assets possess their own distinct features. Gyourko and Linneman (1988) suggested that residential homes have a smaller effect on inflation hedging compared to nonresidential real estate that serves as an income-producing asset. In addition, Wheaton (1999) argued that different types of real estate are characterized by asset durability, supply and demand elasticities, and investment lags. Ghebreegziabiher, Pels, and Rietveld (2007) mentioned that proximity to railway stations has totally different effects on residential and commercial properties. The analysis of all submarkets, especially for residential and commercial properties, is indispensable to making an overall assessment of the real estate market.

Another critical point is that the study of the interaction among different property submarkets has often been limited to scrutinizing the cyclical behaviors of different properties (Edelstein & Tsang, 2007; Kan, Kwong, & Leung, 2004; Kuethe & Pede, 2011; Wheaton, 1999). In fact, interaction among these submarkets can be regarded as alternative version of the ripple effect across properties, rather than across regions. However, there have been surprisingly few studies of the interaction among different property submarkets (Kan et al. 2004). We found only two exceptional examples for the Hong Kong market: one is Ho, Ma, and Haurin (2008) who focused on the domino effect across quality tiers within the Hong Kong market to confirm that housing prices are transmitted from low-quality to high-quality real estate assets; another is Hui and Zheng (2012) who explored the dynamic relationship between the residential and retail real estate markets in Hong Kong using a multivariate stochastic volatility model to find that residential market leads the retail market based on volatility spillover.

Finally, Gyourko (2009) was the first to give much scholarly attention to establish the theoretical basis of possible relationships between residential and commercial properties using different theories: urban economic theory (equilibrium view) and bubble theory (disequilibrium view). This study is what has attracted our interest to the relationship among different property submarkets associating with inspiring us to explore the dynamic interaction among different types of real estate assets using empirical models with econometric methods.

Over the past few years, a considerable number of studies have been devoted to the process of dynamic price diffusion in housing markets across regions, including those of the UK, the Euro area, the U.S., Taiwan, Malaysia, China, New Zealand and Australia. What seems to be lacking, however, is an in-depth discussion of the interactions among different property submarkets within a real estate market, especially in China. We therefore search for the dynamic interrelationships among China's real estate submarkets. For this purpose, residential, office and retail price indices for six Chinese mega cities over a period of 134 months are obtained to construct three panels. This new evidence regarding the interaction among three property submarkets is then examined using panel data econometrics. We believe that an examination of the dynamic relationship among the three property submarkets in China can give us a better understanding of the real estate market as a whole and hence can contribute to the formulation of useful real estate policy recommendations by relevant authorities.

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[1] In fact, another topic of ripple effect points to spillovers among intra-metropolitan geographical units; see for example, Dolde and Tirtiroglu (1997), Basu and Thibodeau (1998), Clapp and Tirtiroglu (1994) and Sing, Tsai, and Chen (2006).