

## Chapter 2

### Literature Review

#### 2.1 House Price Theory

**Mankiw and Weil (1989)** examined the impact of major demographic changes on the housing market in the United States. The entry of the Baby Boom generation into its house-buying years is found to be the major cause of the increase in real housing prices in the 1970s. Since the Baby Bust generation is now entering its house-buying years, housing demand will grow more slowly in the 1990s than in any time in the past forty years. If the historical relation between housing demand and housing prices continues into the future, real housing prices will fall substantially over the next two decades.

**James M. Poterba (1991)** presented a variety of new results on the determinants of house prices. For the 1970s, house price appreciation is consistent with the real user cost analysis of the owner-occupied housing market. This analysis stresses the interaction of high inflation rates with an income tax code that allowed households to deduct nominal interest payments. The 1980s, there is a strong statistical relationship for the United States as a whole between the level of real house prices and the housing demand predicted by the age structure of the population. It also implies that the aftermath of declining house prices in many regions during the late 1980s could be a period of slack housing demand, as many potential homebuyers extrapolate recent price reductions and conclude that house prices will continue to fall.

**Case and Shiller (1990)** founded that the U. S. market for homes appears to be efficient. Price changes observed over one year tend to continue for one more year in the same direction. Construction cost divided by price, the change in per capita real income, the change in adult population are all positively related to price changes or excess returns over the subsequent year.

**Abraham and Shott (1992)** drew on Capozza and Helsley's models of real land prices, and expressed real house price changes as a function of the rate of change

in employment, real income growth, real construction cost inflation, and changes in real after-tax interest rates. Their explanatory power varies widely by region.

**Katinka and Hort (1998)** presented a restricted error-correction model of real house price changes based on Swedish panel data. In the long-run equation, movements in income, user costs, and construction costs were found to have a significant impact on real house prices. They estimate the dynamic equation reveals a rich autoregressive structure in real house prices. They also suggest that adjustment toward the long-run relationship is quite rapid. While the results were consistent with speculative behavior, it is also shown that real house price fluctuations are well explained by the development of fundamental demand conditions in this period.

**John M. Quigley (2002)** suggested that activities in the real estate markets in Southeast and East Asian economies were an important contributing force to the financial crises of 1997 in the Asian economies. The analysis relies upon unpublished data reported contemporaneously by financial institutions and market watchers to document the extent of the imbalances in the real property market that were evident to informed observers at the time of the financial collapse. The analysis argued that a series of reforms in the regulation of the property market and the treatment of real property loans by financial institutions are necessary to prevent the recurrence of the kind of speculative bubble that contributed to the financial crisis in Asia. Given the recentness of the crisis, the nature of the data, and the absence of definitive statistical sources, the results are tentative, but they are certainly consistent with a financial collapse whose proximate cause was unchecked activity in the property market.

**Gregory D. Sutton (2002)** studied changes in six advanced economies, which can be attributed to fluctuations in national incomes, interest rates and stock prices. The main empirical finding is that favorable economic developments captured by these variables appear to have played an important role in recent house price gains, although in some instances prices appear to have increased by more than warranted by the set of fundamental determinants considered.

**Robert F. Martin (2005)** explored the baby boom's impact on U.S. house prices and interest rates in the post-war 20th century and beyond. Using a simple Lucas asset pricing model, the model predicts that the primary force underlying the evolution of real house prices is the systematic and predictable changes in the working age

driven by the baby boom. The model is calibrated to U.S. data and tested on international data. One surprising success of the model is its ability to predict the boom and bust in Japanese real estate markets around 1974 and 1990.

**Joshua Gallin (2006)** showed that the data do not support the view that house prices and income are cointegrated. Standard tests using 27 years of national-level data do not find evidence of cointegration. However, standard tests for cointegration have low power, especially in small samples. The author used panel-data tests for cointegration that are more powerful than their time-series counterparts to test for cointegration in a panel of 95 metro areas over 23 years. Using a bootstrap approach to allowed for cross-correlations in city-level house-price shocks. The author showed that even these more powerful tests do not reject the hypothesis of no cointegration. Thus the error-correction specification for house prices and income commonly found in the literature may be inappropriate.

**Ceron and Suarez (2006)** examined the experience of fourteen developed countries for which there are about thirty years of quarterly inflation-adjusted housing price data. Price dynamics is modeled as a combination of a country-specific component and a cyclical component. In line with previous studies, the mean of real housing price increases can be predicted to be larger when lagged values of those increases are large, real GDP growth is high, unemployment falls, and interest rates are low or have declined. Their findings have important implications for risk management in regard to residential property markets.

**He, Zhang, and Shek (2007)** analyzed both the allocation efficiency and the dynamic efficiency of China's spending on capital. They examined the relationship between investment flows and the marginal product of capital computed by estimating the Cobb-Douglas and CES production functions at both the national and provincial levels. They also investigated dynamic efficiency by comparing the share of capital in national income and the rate of investment. The main finding is that the allocation efficiency of capital in China has improved in recent years, but the high rate of investment may be a sign of dynamic inefficiency of the Chinese economy.

**Égert and Mihaljek (2007)** studied the determinants of house prices in eight transition economies of central and eastern Europe (CEE) and 19 OECD countries. The main question addressed was whether the conventional fundamental determinants

of house prices, such as GDP per capita, real interest rates, housing credit and demographic factors, have driven the observed house prices in CEE. They showed that house prices in CEE can be explained well by the underlying conventional fundamentals and some transition specific factors, in particular institutional development of housing markets and housing finance and quality effects.

**Peng et al. (2008)** studied the nexus between the property market and macroeconomic of China in 1998–2004, using panel data models covering 31 provinces and major cities. The estimates suggested three main conclusions. First, there seemed to be a two-way linkage between property prices and GDP growth. Second, bank credit expansion did not seem to play an ‘accelerating’ role in property price inflation, although the latter is found to have contributed to bank credit increases in recent years. Third, property price growth may have deviated from fundamentals in coastal areas, as evidenced by a negative relationship between housing and rental prices.

**Eloisa T. et al. (2008)** investigated the characteristics of house price dynamics and the role of institutional features in nine Asia-Pacific economies during 1993–2006. On average, house prices tend to be more volatile in markets with lower supply elasticity and a more flexible business environment. At the national level, the current run-up in house prices mainly reflects adjustment to improved fundamentals rather than speculative housing bubbles. However, evidence of bubbles does exist in some market segments.

**Ashvin Ahuja et al. (2010)** found a sharp increase in house prices combined with the extraordinary Chinese lending growth during 2009 has led to concerns of an emerging real estate bubble. They found that, for China as a whole, the current levels of house prices do not seem significantly higher than would be justified by underlying fundamentals. However, there are signs of overvaluation in some cities’ mass-market and luxury segments. Unlike advanced economies before 2007–8, prices have tended to correct frequently in China. Given persistently low real interest rates, lack of alternative investment and mortgage-to-GDP trend, rapid property price growth in China has, and will continue to have, a structural driver.

**Vahram Stepanyan et al. (2010)** analyzed the recent boom-bust cycle in the housing markets of selected Former Soviet Union (FSU) countries. The analysis was

based on a newly constructed database on house prices in the FSU countries. Their estimations suggest that house price developments can largely be explained by the dynamics of fundamentals, such as GDP, remittances, and external financing. Overall, we find that deviations of house prices from their fundamentals have not been pronounced, suggesting that house price bubbles have not been formed in the FSU countries.

## **2.2 Real Estate Price Bubble**

**Kar-Yiu Wong (2001)** explained, with a simple model, the collapse of the housing market in Thailand before the 1997 economic crisis. This paper showed that successive periods of impressive growth of the economy created not only higher demands for housing, but also an increase in people's optimism about market conditions in the future. When the investors are overoptimistic, they oversupply. Such oversupply will lead to a drop in prices in all possible states, thus raising the vulnerability of firms during bad times. Even if it is not obvious that some firms are overoptimistic bubbles may arise, and there is a danger that a large number of firms may experience huge losses. When these firms fail, they create bad loans to financial institutions, which may have difficulties in repaying the loans they have raised abroad. Both oversupply and bubbles were formed before the market finally crashed. The model explains some of these phenomena, and describes the nature of the bubbles. An ironic possibility is that a faster and more persistent growth of the economy tends to increase the vulnerability of the firms in the market.

**Chan, Lee and Woo (2001)** conducted an empirical study for detecting misspecification errors and rational bubbles in the residential housing markets of Hong Kong. They focus on a fundamental model that defines market fundamental price as a sum of the expected present value of rental income, discounted at a constant rate of return. Test result can implications for detecting misspecification errors and/or price bubbles are explored through the flow and stock approaches. In addition, the paper attempted to identify the amount of misspecification and bubble components in the property price data of Hong Kong.

**McCarthy and Peach (2004)** found the strong rise in home prices since the mid-1990s has raised concerns over a possible bubble in the housing market and the



effect of a sharp price decline on the U.S. economy. They assessed two measures frequently cited to support a bubble-the rising price-to-income ratio and the declining rent-to-price ratio - and found the measures to be flawed and the conclusions drawn from them unpersuasive. In particular, the measures did not fully account for the effects of declining nominal mortgage interest rates and failed to use appropriate home price indexes. The authors also made a structural model of the housing market and found that aggregate prices were not inconsistent with long-run demand fundamentals. Accordingly, they concluded that market fundamentals are strong enough to explain the recent path of home prices and that no bubble exists. Nevertheless, weakening fundamentals could have an impact on home values on the east and west coasts, where the new housing supply appears to be relatively inelastic. However, prices in these regions have typically been volatile, and previous declines have not had a sizable negative effect on the overall economy.

**Charles Himmelberg et al. (2005)** constructed measures of the annual cost of single-family housing for 46 metropolitan areas in the United States over the last 25 years and compared them with local rents and incomes as a way of judging the level of housing prices. Conventional metrics like the growth rate of house prices, the price-to-rent ratio, and the price-to-income ratio can be misleading because they fail to account both for the time series pattern of real long-term interest rates and predictable differences in the long-run growth rates of house prices across local markets. These factors are especially important in recent years because house prices are theoretically more sensitive to interest rates when rates are already low, and more sensitive still in those cities where the long-run rate of house price growth is high. During the 1980s, their measures showed that houses looked most overvalued in many of the same cities that subsequently experienced the largest house price declines. They found that from the trough of 1995 to 2004, the cost of owning rose somewhat relative to the cost of renting, but not, in most cities, to levels that made houses look overvalued.

**Xiao and Tan (2007)** applied the method of Kalman filter, which consists of a set of recursive equations, to study housing price bubbles in Hong Kong. They attempted to capture such errors with a latent state variable. This variable is extracted with Kalman filter. The sample includes a set of monthly data stretching from December

1980 to January 2003. Based on their empirical comparisons, they found that it is possible to attribute the observed large price swings in the property market of Hong Kong during the 1980s and 1990s to a periodically collapsing rational speculative bubble. The results indicate that speculative bubbles collapse periodically in Hong Kong. The bubbles were in the stage of collapsing during the first half of the 1980s and appeared again in 1997 before they collapsed after the Asian financial crisis.

**Goodman and Thibodeau (2008)** identified the current speculative bubbles in US housing markets. The fundamentals in their model mainly include income, rent, population, interest rate, user cost and supply shifters. The results illustrated that the expected rate of house price appreciation is very sensitive to supply elasticity. They also found that speculation has driven house prices well above levels that can be justified by fundamentals in less than half of the cities examined. By using “30 per cent over the expected increase” as a housing bubble threshold, they find that 25 of the 84 metropolitan areas exceeded the threshold over the period 2000-2005.

**Glaeser et al. (2008)** analyzed the relationship between housing supply and bubbles with the annual data from 1982 to 2007 in 79 metropolitan areas. The author suggested that, in places where housing supply is inelastic, not only should bubbles be more common and longer but also prices should increase more during bubbles. The results show that most elastic places seem to have avoided a bubble during the 1980s. While more elastic places experienced big price increases during another boom in the 2000s, the housing price booms in these places were much shorter in duration than those in inelastic places.

**Glindro et al. (2008)** explored housing bubbles by investigating the issue of housing price overvaluation in nine Asia-Pacific economies over the period 1993-2006. They quantify two components of such overvaluation: a cyclical component relevant to the intrinsic housing price cycles and a bubble component that cannot be explained by macro and institutional factors. Compared with other studies, they used a wider set of fundamentals in the model. Apart from the traditional demand-side and supply-side factors, they add into the fundamentals equity prices, exchange rates, as well as such institutional factors as corruption, financial sector and property rights. The results suggest that speculative housing bubbles may exist in such

leading markets as Seoul, Beijing and Shanghai, while there is little evidence of overvaluation or bubbles at a national level in the selected economies.

**Sean Holly et al. (2010)** provided an empirical analysis of changes in real house prices in the USA using state level data. They examined the extent to which real house prices at the state level were driven by fundamentals such as real per capita disposable income, as well as by common shocks, and determined the speed of adjustment of real house prices to macroeconomic and local disturbances. They took explicit account of both cross-sectional dependence and heterogeneity, to find a cointegrating relationship between real house prices and real per capita incomes with coefficients (1,-1), as predicted by the theory. They were also able to identify a significant negative effect for a net borrowing cost variable, and a significant positive effect for the State level population growth on changes in real house prices. Using this model they then examined the role of spatial factors, in particular, the effect of contiguous states by use of a weighting matrix. They were able to identify a significant spatial effect, even after controlling for state specific real incomes, and allowing for a number of unobserved common factors. However, they found evidence of departures from long run equilibrium in the housing markets in a number of States notably California, New York, Massachusetts, and to a lesser extent Connecticut, Rhode Island, Oregon and Washington State.

### **2.3 Real Estate Macro-control**

Since the "Keynesian revolution", macroeconomic control issues have become a popular economic theory topic. Real estate macro control is one of most important aspects in macro-control. Western scholars have actively promoted government economic instruments of monetary policy, tax policy, and regulation to intervene the real estate market. William C. Wheaton (1993), as a representative of scholars, discussed the government role in intervening and controlling sufficiency in the real estate market by using macroeconomic theory; Dennis J. McKenzie and Richard M. Betts (1996) proposed that the government should intervene in the housing program. By this way, government intervention is necessary to change disequilibrium of supply and demand. After the 1990s, researchers tried to find a variety of macroeconomic factors which impacted the real estate market. Clapp and



Giaccotto (1994) showed that the changes of macro-economic have good predictive ability for real estate prices by using simple regression analysis, which did not meet the efficient market hypothesis. Quilgey (1999) determined the price and the macroeconomic fundamentals which can explain the real estate-related price indicators, by using balanced supply and demand model. There is no obvious influence in the short-term, but its long-term impact is very significant. Miki Seko (2003) analyzed the regional housing prices and economic fundamentals in Japan using econometric models, and found they have a relatively strong correlation. This result even can predict the real estate market development.

#### **2.4 Highlights of the Study**

This paper examines the characteristics of house price dynamics in twenty-one cities in China and explores the possible emergence of housing bubbles. The closely related papers are Song & Gao (2007), Huang et al. (2007) using the VAR model to discuss the relationship of China's house price and land price. However, these papers are all based on national-level macro data, Liang & Gao (2007) and Peng et al. (2008) used China's provincial-level panel data individually to analyze the influencing factors on house price. However, our study differs substantially from those previous ones in three important ways.

Firstly, most literature based on the macro data uses the VAR model. Although the VAR model can avoid the endogenous problem of variables, the "VAR approach has been criticized as being devoid of any economic content" (Enders, 1995). Because the VAR model is completely dependent on the data's own statistical relationship, any change in sample interval will cause instability of the result. For example, regarding the literature about the relationship of China's housing price and land price that we mentioned before, we find their conclusions differ greatly, even exactly opposite. The VAR model can only include two to three variables, which limits its explanatory power for housing price. So applying panel data approach for estimation of housing prices can avoid the above problems.

Second, Liang & Gao (2007) and Peng et al. (2008) used panel data, but based on China's provincial-level which has problems similar to the national macro data in that they both use the added or averaged data. The sample size of macro data for China's

housing price is generally small. In order to increase the sample size, some literature uses quarterly data rather than yearly data. But China's quarterly housing price index, which is published by the National Bureau of Statistics of China, is a year-on-year index. Since a quarterly year-on-year index cannot be changed to a fixed base index directly, most literature compensates by adding restrictions during the index changing process. This affects the accuracy of the data. In addition, China's provincial administrative regions include several provinces, autonomous regions and municipalities. The nature of municipality data is different from the nature of provincial and autonomous region data which contain some cities, but a municipality (such as Beijing or Shanghai) is actually just one huge city. Using provincial-level panel data may lead to an estimation bias. According to existing literature, this paper is the first one which uses the panel data from 21 of China's main cities to do empirical research about China's house prices.

Third, this study is one of the first papers to detecting housing bubbles in cities of China using panel data test. Previous studies have mainly focused on the lessons from assessment indices which are according to some ratio of house price and economic fundamental value.