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硕 士 学 位 论 文

房地产泡沫：理论与实证问题的调查及鄂尔多斯房地产泡沫的案例

Housing Bubbles: A Critical Review of Theoretical and Empirical Issues and Case Study on the Ordos Housing Bubble

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摘 要

本论文简要概述了在目前背景下对住房市场泡沫问题的研究，重点关注房产价格动态理论及其实践的问题，并对以鄂尔多斯房地产泡沫为本文的经典例题作了进一步阐述。首先以有效市场假说（ EMH ）为主要理论基础进行市场动态分析，简要总结有效市场假说在金融和住房市场问题上的实证检验问题。阐述了有效市场假说和泡沫形成潜在原因的局限性，且探讨了包括理性预期与非理性行为等因素的作用。还提出了两个主要的工作方法及定义，识别和预警房地产泡沫，也对有效市场假说之外的泡沫经济理论作了些简要介绍。本论文以目前国内可能搜集到的数据信息，对衡量判断房地产泡沫的不同方法进行了深入研究。进而以鄂尔多斯房地产泡沫作为经典例题阐述了关于在有限的资源数据采集下对衡量判断房地产泡沫方法的适宜性，优势及局限性。最后，论文针对今后房地产泡沫的研究方向给出了有益的思考与建议。

关键词：泡沫，房地产泡沫，鄂尔多斯房地产泡沫，有效市场假说，非理性行为

Abstract

This paper provides a critical survey of current research on bubbles in the context of housing markets, focusing on theoretical and empirical issues in housing price dynamics, as well as an original case study on the Ordos housing bubble. The paper starts with the Efficient Market Hypothesis (EMH) as the predominant underlying theory for market dynamics and briefly summarizes empirical tests of the EMH in financial and housing markets. The limitations of the EMH and potential causes of the formation of bubbles are then discussed, including the roles of rational expectations and irrational behavior. The paper then presents the two dominant approaches to defining and identifying bubbles—market price deviations from fundamental value and expectations of future price changes—and the methodologies and results of various empirical studies in each category. The applicability, advantages and limitations of the different methods of measuring bubbles are critically assessed, wherein the appropriateness of a method depends largely on the availability and frequency of data. The paper then turns to a case study on the Ordos housing bubble and demonstrates methods of analysis appropriate for housing bubbles in the context of low-frequency and low-availability data. Finally, the paper concludes with an outline of some promising directions for future research in the literature on housing bubbles.

Key Words: bubbles; housing bubbles; Ordos housing bubble; Efficient Market Hypothesis, irrational behavior

Contents

1. Introduction

According to a report by the International Monetary Fund (2003), equity market crashes occur on average every thirteen years, last for about two and a half years, and lead to a GDP loss of about four percent. Real estate market crashes on the other hand occur less frequently, but when they do they last about twice as long and lead to twice as large a loss in GDP. Market crashes are often the result of bubbles that have finally burst. How, then, can we tell whether appreciating prices constitute a bubble or if they reflect changes in market fundamentals? According to Stiglitz (1990), "if the reason that the price is high today is only because investors believe that the selling price will be high tomorrow—when "fundamental" factors do not seem to justify such a price—then a bubble exists" (p. 13). Similarly, Flood and Hodrick (1990) describe bubbles as self-fulfilling prophecies of market participants wherein market prices of assets differ from their fundamental values due to factors extraneous to the market. They observe that one of the primary difficulties in identifying the presence of a bubble is distinguishing between actual bubbles and price changes that are driven by fundamentals. Since current prices depend on expectations of future prices and expectations of future prices likewise depend on current prices, the true model for determining fundamental value is nearly impossible to identify.

Economists and policy makers are justified in their concerns about volatile housing prices. Housing bubbles have been shown to have negative consequences on residential investment and aggregate output (Higgins & Osler, 1998), and steep drops in housing prices can have significant consumption wealth effects wherein a severe reduction in housing prices could markedly reduce total personal consumption expenditures (Case, Quigley, & Shiller, 2005). This follows from the fact that for many households, real estate comprises a large percentage of a household's assets (McCarthy & Peach, 2004). Housing price volatility also impacts urban development by affecting housing construction and migration decisions. Furthermore, housing bubbles and subsequent house price declines stress the financial system and put both lenders and borrowers at risk of unanticipated losses, which could then spread to the general economy and negatively impact economic development (see Orlowski (2008) for a discussion on the links between the credit market, the collapse of the U.S. subprime mortgage market, and the global spread of the financial crisis). The direction of the causal relationship between bank lending and housing prices differs depending on the study, but their close relation means that either a tightening of the

credit market or a sharp decline in housing prices can have devastating consequences on the other (see Herring and Wachter (1998) for a thorough explanation of the relation between real estate cycles and banking crises).

Given the abundance of studies and attention given to stock market prices and price trends, it should be expected that even more attention and effort be given to volatility in real estate markets, which can have greater and longer lasting impacts on the larger economy. Unlike stocks, bonds, or other such financial assets, housing is a basic and necessary need that also doubles as an investment. Except in extraordinary areas in which housing prices have become negligible, such as in shrinking cities (e.g. Detroit) in which population has decreased significantly over time and housing vacancies have increased in spite of falling house prices, housing remains one of the largest expenses and investments individuals or families make. In spite of the importance of housing for consumption or investment, studies on house price dynamics remain strife with difficulties. These difficulties arise not only from the general risk of model misspecification but also from limited and infrequently recorded data and taking into consideration complicated transaction costs, numerous supply and demand variables, low liquidity and high regulations to name a few. For these reasons, housing is a very special fixed asset that must be analyzed differently from other financial assets.

This paper provides a critical survey on the causes of housing bubbles and methods to detect them, focusing on theoretical and empirical issues in housing price dynamics. The paper is organized into seven sections. Following this introduction, Section 2 introduces the Efficient Market Hypothesis (EMH) and summarizes empirical tests of the EMH in financial markets and housing markets. Section 3 discusses limitations of the EMH and causes behind the formation of bubbles. Section 4 presents some of the major methods for identifying bubbles and determining the fundamental value of housing. Section 5 provides some alternative explanations for the formation and presence of bubbles outside the context of the EMH. Section 6 turns to a case study on the Ordos housing bubble, demonstrating methods of analysis appropriate to the context of low-availability and low-frequency data. Finally, Section 7 concludes this paper and outlines some promising directions for future research in the literature on housing bubbles.

2. The Efficient Market Hypothesis

2.1 Introduction to the Efficient Market Hypothesis

In any market, efficiency and equilibrium are goals that market participants and regulators strive for. To understand housing bubbles, one must first understand housing dynamics and how housing markets achieve or fail to achieve market efficiency. The Efficient Market Hypothesis is the first theory to explain how financial markets achieve efficiency by utilizing information and arbitraging away excess profit opportunities. Since the theory became mainstreamed, economists have applied it to almost every financial market in existence including commodities, resources, fixed assets and intangible financial assets. It is therefore imperative to begin any discussion on housing dynamics or housing bubbles with a brief introduction to the Efficient Market Hypothesis.

The premise of the Efficient Market Hypothesis (EMH) is that the allocation of resources in an economy should reach an efficient equilibrium when prices fully and immediately reflect all available information. In this way, prices should be at levels consistent with fundamentals. In an efficient market, economic profits—excess profits above the market rate of return—should not exist, and market prices should provide accurate signals to investors and other market participants. However, the concept of 'all information' being readily available and used is a very strong form of the hypothesis. In reality, not all information is costless to obtain, and a more practical interpretation of the EMH might be for prices to reflect all information that can be obtained without the marginal costs exceeding the marginal benefits of obtaining the information (Jensen, 1978).

Acknowledging that the original hypothesis was too strong, Fama (1970) differentiates informational efficiency into three forms: weak, semi-strong and strong. In testing weak-form efficiency, the only information subset of interest is publicly available data on historical prices and returns. In testing semi-strong form efficiency, the information subset extends to all publicly available information and the speed of price adjustment becomes a primary area of interest. Tests of weak-form and semi-strong form efficiency often use the general framework of returns,

$$r_t = \mu + e_t \quad ,$$

where r_t is the return at time t, μ is the mean return, and e_t is the error term at time t, assumed to be serially uncorrelated to any element in the relevant information set. If weak-form efficiency holds, then e_t should follow a random-walk process. The idea behind the random walk is that tomorrow's price should depend only on tomorrow's news, not any prices changes from today, so that future price movements should not be predictable based on past price movements and no trading rules should be able to consistently earn above-normal returns after accounting for transaction costs. If semi-strong form efficiency holds, then the hypothesis that the coefficients of any regressors added from the relevant information set are equal to zero should fail to be rejected and future price movements should not be predictable based on any publicly available information.

In tests of strong-form efficiency, the concern is whether investors can consistently earn above-normal risk-adjusted returns by having monopolistic access to any information relevant to price formation. If strong-form efficiency holds, then investors cannot consistently earn above-normal returns using any information, either public or private. Strong-form efficiency is what economists, market participants and regulators all strive for, as it ensures that prices fully reflect all available information and that there are no arbitrage opportunities from which to consistently earn profit. Thus, all resources would be properly allocated to their most productive use. The reality, however, is that strong-form efficiency is very difficult to test for as economists cannot ascertain whether agents hold private information that they have used in their pricing of assets.

2.2 Testing the Efficient Market Hypothesis and its predictions

The Efficient Market Hypothesis is a compelling theory for the pricing of assets, but does empirical evidence from existing markets support this theory? First conceived in the 1960s, the EMH has been lauded for explaining the equalizing force that keeps market prices from becoming predictable and helps to allocate resources efficiently. However, the theory has been cast into serious doubt following market catastrophes, such as the dot-com bubble of the late 1990s and early 2000s and the 2007-2008 global financial crisis. Supporters and critics of the EMH have empirically tested the theory using returns for various financial assets. A logical way to test whether the hypothesis holds is to see if the EMH predictions are supported by empirical

literature (see Malkiel (2005) and Beechey, Gruen, and Vickery (2000) for useful reviews on the EMH, its predictions and criticisms of the theory).

One of the predictions of the EMH is that asset prices should follow a random walk over time, which has been found to be approximately true although the time horizon for stock returns may show small positive autocorrelations for short holding periods (Campbell, Lo, & MacKinlay, 1997). As Beechey et al. (2000) explain, this slight predictability in stock returns is generally offset by the much greater instability in returns and unsuited to providing a profitable trading strategy, especially after accounting for transaction costs. Another important prediction is that new information should be quickly incorporated into asset prices. This rapid incorporation of new information is supported in general, although some empirical studies point to a slight adjustment delay in stock prices following profit or loss announcements (Chan, Jegadeesh, & Lakonishok, 1996; Fama, 1998).

Current information should also not be able to predict future returns, and yet there are several phenomena that would suggest that this prediction does not hold. One such phenomenon is that value stocks, such as those with low P/E ratios, seem to outperform the market in the long run (Fama & French, 1992; De Bondt & Thaler, 1985) without higher risk necessarily accounting for the difference in returns (Lakonishok, Shleifer, & Vishny, 1994). In the foreign exchange market, the current forward exchange rate should be an unbiased predictor of the future spot exchange rate such that their expected returns should be equal to avoid arbitrage. However, empirical studies suggest that the forward exchange rate is actually a biased predictor, with the spot exchange rate moving away from the forward exchange rate rather than towards it in negative correlation (Hansen & Hodrick, 1980; Goodhart, 1988; Frankel & Chinn, 1993; Krugman, 1993). Another phenomenon is that stocks with favorable returns in the recent past tend to continue to exhibit above-market returns in the short-run (Jegadeesh & Titman, 1993).

These phenomena or anomalies, while not exhaustive, conflict with some of the basic premises of the Efficient Market Hypothesis, rejecting its validity. However, validity of the above evidence has been argued against by supporters of the EMH. Some of the arguments include market anomalies being sensitive to data gathering and methods of analysis (Fama, 1998), observed predictability in returns actually just reflecting the risk premium for risky stocks (Bollerslev & Hodrick, 1992), and the degree of predictability (in the foreign exchange market,

for example) being too small or unstable for arbitrage after taking transaction costs into account (Goodhart, 1988).

Even though the Efficient Market Hypothesis has been cast into doubt, many empirical studies still suggest that financial markets are generally efficient, especially for highly traded assets like stocks and bonds. Probably some of the strongest evidence that the EMH is still a valid theory is that professional investors do not usually outperform the market by a wide margin. If prices were predictable instead of conforming to the random walk theory, then actively managed investment funds should garner much more favorable returns than passive buy-and-hold index funds. Malkiel (2005) supports the idea of market efficiency using data from Lipper Analytical Services, Wilshire, and the Vanguard Group. He shows that for investment periods of 10 or 20 years, the S&P 500 Index Fund tends to outperform over 80% of actively managed equity mutual funds by at least 200 basis points. It should be noted, however, that Malkiel and many other economists believe in efficiency, but their understanding of 'efficiency' does not necessarily mean that prices should always be perfectly aligned with fundamentals or that irrational behavior does not factor into price trends. Rather, their idea of market efficiency merely means that any new information is quickly incorporated into prices and that investors cannot reliably exploit market anomalies after accounting for risk and transaction costs. Just because empirical evidence is statistically significant does not always mean that the anomalies are economically significant, and only in hindsight may it be obvious that prices were greatly misaligned with true value.

One of the main empirical challenges of testing the Efficient Market Hypothesis is that it requires a joint test of market efficiency and model specification. When an empirical test rejects the hypothesis of market efficiency, then the question becomes whether the market is truly inefficient or if the model chosen is incorrect, the so-called 'bad model' problem (Fama, 1991). If either information on returns or the selected model is incorrect, then the results could be questionable if not completely invalidated. Later in the paper, examples of different models for calculating fundamental value (of housing prices) will be presented, all of which have their logic, but all of which are also unique in their model specifications and variables. Some models may seem more complete than others, but there is no sure way to identify if a model is truly complete or correct; all models are susceptible to omitted variable bias as some may focus on macroeconomic variables while others focus on ratios or supply and demand factors. Attempting

to include all possible related variables would necessarily complicate the model, making empirical analysis extremely difficult or impossible.

2.3 Testing the Efficient Market Hypothesis in the context of housing markets

Previously, it was shown that the EMH is generally supported in many financial markets, and even some phenomena or evidence that cast doubt on the theory could be explained by risk premiums, transaction costs, data collection methods or model selection. Although many empirical studies support the notion of a high degree of efficiency in financial markets, the empirical literature on housing market efficiency paints a very mixed story on the validity of the EMH. Compared to assets such as stocks or bonds, real estate assets are highly illiquid, durable, long-lived, and immovable with high transaction costs. These key differences between real estate assets and other major financial assets make it more difficult to verify whether market efficiency holds in housing markets.

Some studies supporting the weak-form efficiency of the EMH in housing markets claim that investors cannot consistently outperform buy-and-hold trading strategies (Green, Marx, & Essayyad, 1988) and that house price indexes adjust fairly rapidly to changes in the inflation rate (Guntermann & Norrbin, 1991), suggesting that housing prices quickly and quite fully incorporate public information on past prices and returns. Several empirical studies testing for semi-strong form efficiency also fail to reject the EMH by showing that housing prices respond quickly to new public information (Skantz & Strickland, 1987; Ford & Gilligan, 1988; Delaney & Smith, 1989; Evans and Rayburn, 1991), that the prices of corporation-sold and individual-sold homes do not differ significantly in a common market (Turball, Sirmans, & Benjamin, 1990), that serial dependence of after-tax excess returns is substantially diminished when the returns are adjusted to allow for auto-correlated inflationary shocks (Gatzlaff, 1994), or that there is no later abnormal increase in value of previously undervalued properties after taking into account transaction costs (Linneman, 1986).

By nature of the complexity of the housing market, many empirical studies also reject the EMH. Some studies rejecting the weak-form efficiency of the EMH show that both changes in housing prices and after-tax excess returns are positively auto-correlated, possibly due to the failure to include predictable real interest rates in housing prices (Hosios & Pesando, 1991; Ito &

Hirono, 1993). Foreseeable demographic shifts can also affect prices (Mankiw & Weil, 1989), and some macroeconomic variables—construction costs, income growth, tax rates and unemployment rates—can be used to forecast housing prices such that housing prices are correlated with publicly available information (Clapp & Giaccotto, 1994). Only a few examples of studies testing the EMH in the context of housing markets are presented here, as the focus of this paper is not on tests of market efficiency but rather on the dynamics of housing bubbles. For comprehensive literature reviews on studies testing real estate market efficiency, see Gatzlaff and Tirtiroglu (1995) and Cho (1996). While Gatzlaff and Tirtiroglu (1995) focus on tests of market efficiency, Cho expands on their paper by including measurement issues in estimating house price indices and excess returns on investment.

3. Limitations of the EMH and the formation of bubbles

If prices were at equilibrium or close to fundamental value, economists and regulators would have little cause to worry about impending market crashes. What they fear are large, prolonged misalignments of prices that could have overarching negative consequences for financial markets and the larger economy. Bubbles are sometimes considered evidence of the failure of market efficiency. Do bubbles exist because the EMH does not hold, or can bubbles and market efficiency co-exist?

Like any theory, the EMH has its limitations. Ball (2009) lists several of the ways in which the EMH has been misunderstood in practice. First, the EMH never reduced the need for information; even if market prices reflect currently available information, there would still be a need to obtain new information to prevent prices from deviating away from their true values in the future. Second, the EMH should not actually predict crises; if a crisis could be predicted, then it would indicate that current market prices were inefficient because they did not include the information from the prediction. Third, an efficient market could still coincide with the collapse of large financial institutions; the size and status of an institution shouldn't guarantee any extra protection from competition in an efficient market. Fourth, the EMH makes no mention of the shape or stationarity of return distributions; the theory only suggests that given a certain amount of publicly available information, security prices should reflect minimum-variance forecasts of future prices to be considered efficient. This, Ball believes, is one of the theory's greatest limitations. Ball goes on to state other limitations of the theory, such as ignoring the cost of

processing information (even if acquiring information is assumed costless) and failure to clarify the role of transaction costs, liquidity effects, and investor taxes.

Over-confidence in the EMH has received particular attention and blame for the occurrence of speculative bubbles. Critics of the EMH argue that investors and regulators may have been swayed by the idea of market efficiency; because they believe market prices should already reflect all available information, they thereby diminish their own efforts to verify fundamental values of traded assets. Many studies have also questioned the validity of using the EMH framework to analyze asset prices. Summers (1986) points out that the short-run behavior of asset prices can resemble that of a random walk if prices respond rapidly to new information, but if the misalignment grows or unwinds gradually, then asset prices may deviate greatly and for extended periods of time from their fundamental value. Black (1986) states that sufficient profit opportunities must be available to compensate investors for the costs of gathering new information. The profits to be made from information-gathering are the economic rents provided by noise traders, who mistake market noise for useful information. De Long, Shleifer, Summers, and Waldman (1990) expand on the concept of noise traders by proposing that asset markets could be analyzed as being populated by rational agents that understand the market and irrational agents that trade based on market noise. They state that irrational 'noise traders' can exhibit bullish behavior unrelated to actual fundamentals and that their bullishness fluctuates. Thus rational traders, who tend to analyze the market based on news, require a compensation for the unpredictability and volatility of the bullishness of noise traders. De Long et al. (1990) claim that this framework of rational and irrational traders is inconsistent with the EMH because prices are influenced by noise traders who misinterpret or ignore information. Beechey et al. (2000) caution against aiming all blame for long-term price misalignments at the EMH because of the difficulty in assessing real-time fundamental values of assets. Only in hindsight can a consensus more fully emerge on the misalignment of asset prices, otherwise the misalignment would presumably have been unwound quickly following discovery.

The general interpretation is that bubbles are a sign that the EMH does not hold in the market studied. However, according to these authors, significant price deviations can occur even in markets that appear to be efficient, and that there must be profit incentives to motivate agents to gather new information which is used in the pricing of assets. Thus, depending on how the theory is used and understood, bubbles and the EMH need not be mutually exclusive.