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Jiang Du
University of Rhode Island

Shaw K. Chen
University of Rhode Island, schen@uri.edu

Jeffrey E. Jarrett
University of Rhode Island, jejarrett133@outlook.com

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Competition in China's Real Estate Industry

Jiang Du

University of Rhode Island

Shaw K. Chen, PH.D

University of Rhode Island

Jeffrey E. Jarrett* PH.D

University of Rhode Island

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Professor Jeffrey Jarrett is the corresponding author. Correspondence should be sent to, Professor Jeffrey E Jarrett, Management Science and Finance Faculty, University of Rhode Island 7 Lippitt Road, Kinston RI 02881-0802, Kingston, RI, E-mail:**jejarrett@mail.uri.edu** .

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Abstract

Does the rate of return from the Chinese real estate industry correlate with the intensity of competition among real estate firms? If China's equity market performs efficiently, the rates of return of real estate firms should vary indirectly with their level of monopoly power. Greater monopoly power reduces earnings risk and leads to lower costs of capital. We analyze empirical evidence and indicate no relationship exists between returns and competition. Speculation may induce stock prices to deviate from normal values. Since *normal* values assume no speculation, Chinese markets are not likely to be economically efficient.

Key words: ***abnormal return, competition, Chinese equity markets, efficient markets, real estate, HHI Index, Normalized HHI Index, Lerner Index***

1. Introduction

In July 1998, the Chinese government greatly adjusted its housing subsidy for families and individuals. The official document entitled “the resolution on continuing urban housing system reform, accelerating housing development” brought an end to the welfare housing allocation system and changed the residential housing market into a commercial market. Since then, China has witnessed the long lasting prosperity of its real estate market. Today, housing prices in China are skyrocketing, and remain a serious threat to economic expansion. Although this is important, we focus this study on other.

We first study the return of real estate firms and then track the change of competition in this industry since 1998. The objective is to determine whether the rate of return from China’s real estate industry correlates with the intensity of competition.

Fama (1991) showed that in efficient markets, stock prices should integrate all available information to reflect its true value. Peress (2010) argued that if the equity market is efficient, a firm’s monopoly power in product market exerts an indirect influence on its stock via the informativeness of prices, promoting greater trading volume and reducing expected returns. Hou and Robinson (2006) state that firms in more concentrated industries earn lower returns even after controlling for size, book-to-market, momentum, and other determinants of the rate of return. Stated differently, the market power of a firm is negatively correlated with returns. Firms with greater market power have more resources to insulate themselves from economic

shocks and they can pass increased costs on to consumers. This insulation reduces the risk associated with profitability. Hence, monopolistic competition characterizes the real estate industry in China.

Previously, Kuang (2004), Wang et al. (2004) and Li (2005) evaluated the monopolistic extent of China's real estate industry by the Lerner Index (LI), which is expressed as $LI=\frac{1}{\varepsilon}=\frac{P-MC}{P}$ where ε is elasticity, p is the price of real estate and MC is the marginal cost of real estate industry. We don't think that Lerner Index is a direct index of China's real estate monopoly. For example, the price of real estate in China cannot objectively reflect its real value. Also, LI is the reciprocal of elasticity, which is better measurement for individual firms than for an entire industry. Therefore, we use the Herfindahl Index to measure the monopoly power of China's real estate firms. Our result shows that monopoly power in China's real estate market is very large. Also, the result shows that the monopolistic extent in real estate varies from year to year. From Fama's conclusion (1991) that stock prices should integrate all available information in the market, if market is efficient. Therefore, based on the above analysis if China's equity market performs efficiently, we should observe that the returns of real estate firms should vary indirectly with the level of monopoly power. Further, our research goal is to determine whether a negative relationship exists or not between the return to real estate firms and the level of monopoly power in China's real estate industry. If this result does not occur, the return on real estate stocks demonstrates that the price of stock in China's equity market cannot reflect the market information and firm risk. Great speculation in China's real estate market induces stock prices to deviate from the normal value if no speculation existed. Our findings will indicate

whether variations in the level of competition relate to variation in returns of a portfolio of real estate securities.

To build our behavioral model which relates market efficiency to return, we follow the works of previous researchers. Laurence et al. (1997), Liu et al. (1997), Chen et al. (2010), Moorkejee and Yu (1999) suggest that China's equity market is not efficient or returns on equity are difficult to predict. The cause of the lack of predictability may be the relationship of Chinese stock behavior to factors outside of China (Jarrett and Sun, 2012), (Irvine and Pontiff 2008), (Peress, 2010), (Hou and Robinson, 2006), and (Lyandres and Watanabe, 2011) indicate that the intensity of product competition links with variation in stock price which are related to factors exogenous to the Chinese economy.

We organize the remainder of this paper as follows. Section 2 describes the data and methodology collected and analyzed; section 3 discusses the empirical results of analyzing the behavioral model; last, section 4 summarizes the analysis and draws conclusions.

2. Data and Methodology

2.1 Data

We obtain China's equity market data from the Pacific-Asian Capital Market Research Center (PACAP) and the PACAP-CCER China Database located at the University of Rhode Island. Prior to 1997, China's equity markets were not well-regulated. Hence, we only use the data from 1997. The real estate firms in this dataset are defined as either residential real estate firms (i.e.

housing) or commercial real estate firms (i.e. office building or warehouse space etc.) . Therefore, in our data the real estate firms include both the residential real estate firms and commercial real estate firms.

2.2 Measurement of Monopoly

In this paper, we use Hirschman-Herfindahl Index (HHI) to measure the monopoly of real estate industry. The HHI index, denoted as H in this paper, is calculated by the following formula:

$$H=\sum_{i=1}^{N} S_i^2$$

where s_i is the market share of firm *i* in the market and *N* is the number of firms. For example, in a market with two firms that each have 50 percent market share, the HHI index equals $0.50^2+0.50^2 = 1/2$. The HHI Index ranges from 1/*N* to one, where *N* is the number of firms in the market. A HHI index below 0.01 indicates a highly competitive index. A HHI index below 0.15 does not indicate market concentration. A HHI index between 0.15 and 0.25 indicates moderate concentration or moderate monopoly. A HHI index above 0.25 indicates high concentration or high degree of monopoly. A small index indicates a competitive industry with no dominant players. If all firms have an equal share, then the reciprocal of the index shows the number of firms in the industry. We can also normalize HHI index so that the standardized HHI index (H^*) ranges from 0 to 1. It is computed as:

$$H^*=\frac{(H-1/N)}{(1-1/N)}$$

where N is the number of firms in the market, and H is the usual HHI Index, as above. We use normalized Herfindahl index in our regression model to avoid the spurious effect of the difference in the number of firms in each year.

2.3 Methodology

We define the real estate stocks as a portfolio consisting of all the real estate firms listed in China's equity markets and adjusted by their market value weight. The market value is calculated by price times the outstanding shares at the end of each year.

To calculate HHI, we first define the real estate firm listed in the equity market as the known firms. We then assume that the real estate firms not listed in equity market (unknown player) have the market share lower than the any of the listed real estate firm. Such assumption is reasonable considering the fact that in China the firms with large market share have the priority to get access to equity market. We calculate the market share of i firm (s_i) as the ratio of its sale to the total sale of the firms in this industry. The HHI index is calculated as H=$\sum_{i=1}^{N} S_i^2$ where N is the number of the real estate firms in the equity market. Then we can obtain the normalized HHI index as $H^*=\frac{(H-1/N)}{(1-1/N)}$.

We tell whether the China's equity market is efficient when the abnormal return on real estate stock merely varies with the change extent of monopoly.

3. Empirical Results and Explanation

Observe in Table 1 the development of China's equity markets from 1997 to 2010. During this period, the scale of China's equity markets grew rapidly with the number of the listed firms increasing from 720 to 1,895. However, the increase in the number of real estate firms was not as impressive (93 to 133) in comparison with the expansion of the entire market during the same period. The proportion of real estate firms dropped from 0.119 to 0.044. Table 1 shows that the real estate market became more active after 1997. Its importance in the aggregate Chinese equity market became smaller as indicated by its relative reduction in size.

Table 2 reports the difference between the mean daily turnover rates of real estate (RE) firms and that of all other firms. The daily turnover rate is equal to the stock trading volume divided by its total outstanding shares. The purpose of this table is to show the variation in the market to purchase real estate equity. This table shows that in the 14 years, from 1997 to 2010, six years (2001, 2002, 2006, 2008, 2009, and 2010) the RE stock daily turnover rate is faster than other firms at significance levels of 0.0001 or less. There are only two years (2003, 2004) when the RE stock turnover rate is slower than for other firms. Since the turnover rate measures how active the equity is in the market, we observe that, on average, China's real estate firms are more active than other firms. Further, the change in real estate equity trading is consistent with its attractiveness. China's private real estate market was formed only after 1998. Since private real estate is a new market in China, the potential of its profitability was not felt immediately. After 2001, China's investors began to purchase greater amounts of real estate equity than other types. The most active period of China's housing market began in 2001 when commercial property became an investment option and not only a commodity. The greatest change occurred in 2009 and 2010 when China implemented its 586 billion dollar economic

stimulus package to deal with the global financial crisis. The direct consequence of the implementation was the increased prosperity in the real estate market in a manner similar to the way stimulus programs increased economic activity in other nations.

Table 3 reports the market return and the return of the portfolio consisting of all real estate equity firms in the market (RE stock portfolio, hereafter, RE). The table shows how China's equity market fluctuates greatly. The return of real estate stock correlates with the market return. In 2006 and 2007, the market return reached as high as 114.9% and 247.73%, while in 2008, the return was negative (-58.8%). Both the market and the RE stock portfolio yearly return were greatest in 2007 when China's stock market index reached its peak. Wide fluctuations indicate that China's equity market is permeated by a strong speculative atmosphere and volatile investment behavior. Thus, the stock price dramatically deviates from its "true value". The return of real estate stock portfolio correlates with the market return and this may suggest that China's equity market does not indicate the direction of aggregate economic activity in the entire nation. The period between 2001 and 2005 is the time when China experienced development attributed to the benefits of entering the World Trade Organization (WTO) in 2000. On the other hand, China's equity market suffered great losses during this period.

To measure the level of competition in the real estate industry, we utilize normalized HHI index as noted before. The normalized HHI index eliminates the spurious effect of the different number of firms in each year. To precisely calculate the market share of each firm, the sale used in HHI index is the income that the firms obtain from the business of selling real estate.

The income that the firms get from any other business is not included. We report the normalized HHI index of the China's real estate industry from 1997 to 2010 in the last column of table 3. We continuously interpret the normalized HHI index before 1999 because China's equity market then was primitive.

The normalized HHI index (H^*) gives us a picture how the competition in China's real estate industry varied from 1999 to 2010. The figures in the table show that overall the competition experienced greater intensity during that period. From 1999 to 2003, the index continuously becomes smaller. In 2004, the index rebounded slightly and then fell back. In 2008, the index rebounded again. Although competition is more and more intense, China's real estate industry is largely monopolistic. Note, the normalized HHI index is always greater than 0.25. Therefore, our results are consistent with Li's (2005) conclusion that between 1999 and 2004 competition became more intense.

Another question is whether the increasing trend in competition of the real estate industry predicts the trend of RE portfolio return. From the previous analysis, we observed that the portfolio return does correlate with the market return. Since China's stock market does not function as the thermometer of its economy, the competition in the real estate industry should correlate with market return. Hence, we use the abnormal return of the RE portfolio rather than its actual return. The abnormal return equals to the return of the RE portfolio minus the market return. Figure 1 is the trend of RE abnormal return of RE portfolio during the same period. Figure 2 is the trend of competition in real estate industry from 1999 to 2010. We

cannot conclude from the figure whether the trend in Figure 2 predicts the trend in Figure 1. Hence, abnormal returns are not predicted accurately by the intensity of competition.

However, the lack of association is perhaps spurious because the determinants of stock returns include variables other than the level of competition in the industry. They include the factors like size, book-to-market ratio and others. To rule out the possible endogeneity, we explore a new model where the abnormal returns(AR) is the dependent variable of a linear function. In this model, we include not only the factor of normalized HHI Index but also the factors of size and book-to-market value. The normalized HHI Index represents the competition of this industry. The size factor is signaled by the logarithmic ratio of the market value of the RE portfolio to the market value of the equity market, while the book-to-market ratio is signaled by the logarithmic ratio of the book value of RE portfolio to the market value of RE portfolio. The coefficients of these two factors will account for normal factors affecting the abnormal returns. The coefficient of normalized HHI index accounts for the effect of competition on the abnormal return. To estimate the regression model, we calculate all the variables at the end of each quarter. Our research question refers to whether the market is efficient. If it is, the coefficient of the normalized HHI Index should be negative. However, we note in Table 5 that none of our regression models indicate that the estimated regression coefficient of normalized HHI index is statically significant. Such result suggests that extent of competition in real estate industry cannot predict the abnormal return of the stocks in this industry. This provides evidence that China's equity markets are not efficient.

Of course, we still should be very cautious to explain the above results. The real estate industry creates problems in China because it may greatly disturb China's economy but also negatively affect the ability of many to afford acceptable housing. In turn, Chinese authorities created a series of policies to intervene in the real estate market several times since 2003. Although these interventions could somehow correct the distorted price in the market, they still created disparities in the equity market. In addition, they create inefficiency in equity markets, which is consistent with our conclusion that China's equity market is not efficient.

3 Summary

We analyzed whether the change in competition in China's real estate predicts the change of RE equity returns. Firms with more monopolistic power can insulate themselves from economic shocks and pass these shocks on to consumers. Such insulation reduces the riskiness of firms' economic viability. More intense competition in the industry creates greater risk for the firm is. In an efficient market, the return of a firm's stock should be directly correlated with the risk of this firm. We should observe the positive correlation between competition and return. Since China's real estate market effectively started in 1998, the competition in this industry became more intense. If its equity market is efficient, we should also observe a market return increasing as time passes.

We tested this hypothesis, for each year by forming a value-weighted portfolio consisting of all firms in the real estate industry. In turn, we calculated the return on this portfolio and the market average return in each year. Abnormal returns for this portfolio are the difference between these two returns. We calculated the Lerner index to measure the level of competition

in the real estate industry. Comparing the trend of the HHI index with the trend of AR, we found that the trend of AR does not predict the trend of the HHI index. However, if the determinants of returns do not include the intensity of competition, such conclusion may be wrong. Therefore, to avoid the problem of structuring the model improperly, we developed a model in which the abnormal return is the response variable, and the predictors are size, the book-to-market ratio and the HHI index. The result indicated that competition in the real estate industry does not predict the return for firms from in the industry. These findings lend evidence as to the inefficiency of China's equity markets, which is accordance with other published studies. Additional analysis employing granger causality may help in deepening the significance of our findings. However, we feel that the length of the time series studied do let us state our findings and observations. Furthermore, our finding indicates the economy of China as well as its real estate section is in great transition (Lu, 2011).

[1] The authors wish to thank the anonymous reviewers for comments on earlier versions of this manuscript. Professor Jeffrey Jarrett is the corresponding author. Phone: +1 (401)-874-4169, E-mail:**jejarrett@mail.uri.edu** .

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