

Does China Really Have a Serious Real Estate Bubble?

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Abstract

This research uses 2002-2013 Chinese data to analyze the Chinese real estate market. We look at the returns on direct real estate, securitized real estate, and the general stock market. We compare the financial health of the real estate industry to the financial health of other industries. We do not document an overheating real estate industry, even though the real estate industry does have a higher debt to asset ratio compared with other industries. The monthly return is above 1% for all three types of investments (direct real estate, securitized real estate, and the general stock market). The Chinese economy does grow at a shocking pace. This is not limited to one industry. If there is overheating, we believe it relates to the Chinese economy as a whole.

I. Introduction

China's real estate market has unique characteristics. All real estate in China was owned and managed by the government under the central planning economic regime before 1988 (Fung, Huang, Liu, & Shen, 2006). The 1988 Constitutional Amendments separated the land ownership and land use right. One primary difference in the meaning of real estate in China versus other developed economies is that the term real estate in China refers only to land use rights plus the ownership of the improvements on the land. The state is the owner of the land. The lease terms of the land range from 50 to 70 years. Here we are only referring to mainland China. Hong Kong's real estate ownership system is similar to that of the United Kingdom. The Chinese real estate securities market is still relatively undeveloped. There is no REIT market in China.

The 1988 Constitutional Amendments made it possible for individuals to own real estate. China's real estate market has been developing rapidly since the amendments were adopted. China's real estate industry has evolved from a minimal presence in 1978 to one of the most important driving forces behind national economic growth. Real estate development is a key factor in economic growth as real estate is an essential part of the manufacturing process of goods and services, and property rights are the foundation of a well-functioning market. China's real estate market now is one of the biggest recipients of foreign direct investment in China (Fung et al., 2006). In our research period from 2002-2013, the average monthly return on direct real estate is over 1%. No other large area in the modern era has exhibited a similar property appreciation rate over such a long period (Wang and Wang, 2012). The rapid appreciation has caused concerns about a possible real estate bubble. The long sustained increase in housing prices seems to fit the very definition of a housing bubble as defined by Case and Shiller (2004). In their study, Case and Shiller attribute housing market price increases to the expectations of individuals who want to buy houses. Housing prices cannot continue to increase at a rapid pace forever. A bubble in the housing market should emerge at some point if the rapid pace of price

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increases continues. As expectations about housing prices change, demand will decline and so will prices. This paves the way for a collapse in the housing price bubble. Glaeser, Gyourko, and Saiz (2008) describe housing bubbles as arising from irrational over optimism and adaptive expectations, which seem to fit the China real estate phenomenon as well. The Wall Street Journal published an extensive article about the Chinese housing bubble in April, 2014 (Davis & Fung, 2014). However, despite all the speculation and concern, the world is yet to see China's real estate bubble burst.

Determination of the presence of a housing bubble is a challenging process. Recent studies use standard present value formula (Shiller, 2000; Mikhed & Zemcik, 2009; Phillips, Shi, & Yu, 2012). Another approach is supply demand analysis (Ihlanfeldt & Mayock, 2014; Huang & Tang, 2012; Glaeser et al., 2008). This examines the potential real estate bubble from a new perspective. We are the first study to analyze the housing bubble by evaluating direct real estate in comparison with other investment channels and to evaluate the performance of the real estate industry. We first look at the relationship of direct real estate, securitized real estate and the general stock market to determine whether the return from real estate investments is much different than the return from the general stock market. Given a similar economic environment, a much higher return from real estate would indicate a possible real estate bubble. We then look at the financial health of the listed real estate firms. We look at current ratio and debt to asset ratio to evaluate the industry's solvency and flexibility. We look at sales, net income, and return on equity to evaluate the industry's profitability. We look at income and capital growth to investigate industry growth. We believe we should see a troubling financial picture for the real estate industry if there is a possible real estate bubble.

II. Literature Review

Mikhed and Zemčik (2009) study the implications of the standard present value formula on house prices and rents. They formulate a procedure to determine the extent to which there is a discrepancy between house prices and their fundamentals. If the house prices are non-stationary while rents are not, it is an indication of a bubble.

Chen and Funke (2013) use recursive unit root tests to detect the bubbles in the Chinese housing market. They find that actual house prices are not significantly disconnected from the fundamentals except in 2009-10.

Yiu, Yu, and Jin (2013) investigate the housing market in Hong Kong. They detect several positive and negative bubbles. They document the housing bubble in early 2011 in the mass market segment but not in the luxury segment. This suggests that the bubble in 2011 was caused by the demand pressure for small-to-medium sized apartments.

Glaeser et al. (2008) are the first to study a housing bubble using supply demand analysis. The supply elasticity proxy is developable land within a metropolitan area. They conclude that less supply elasticity causes greater price appreciation and less construction in boom periods. Although not as robust, the evidence also suggests there is no relationship between the supply elasticity and the fall in housing prices in the bust period.

Ihlanfeldt and Mayock (2014) analyze housing price and housing supply based on actual estimates of supply elasticity. They find that boom periods are characterized by greater construction and less price appreciation when the supply elasticity is high. There is more new construction in high supply-elasticity areas than in low supply-elasticity areas during bust periods. The magnitudes of price changes are unaffected by supply elasticity.

Huang and Tang (2012) use a developable and residential land use regulatory index as a supply elasticity proxy. They document that more restrictive residential land use regulations and geographic land constraints are linked to larger booms and busts in housing prices.

Piazzesi and Schneider (2009) find that a relatively small group of optimists can drive up housing prices assuming selling prices are negotiated between buyer and seller, optimists account for a large percentage of transactions, and transaction costs are sufficiently high to keep satisfied homeowners from flooding the market so available supply does not increase substantially.

Lin and Fuerst (2014) study the long-term relationship between stock values and direct real estate values in nine Asian countries from 1980 to 2012. They find that the values of stocks and real estate were not related in six of the countries studied including China. Lin and Lin (2011) find no causality relationship between stock and real estate markets in China from March 1995 to June 2010. On the contrary, Gao, Li, and Gu (2012) conclude that the Chinese direct real estate market and the Chinese stock market are integrated.

Su (2011) concludes that, in the long-run, asymmetric price transmissions do exist between real estate and stock markets in Western European countries. These findings support the existence of long-run equilibrium relationships between the real estate market and the stock market, with asymmetric adjustment. The study period was 2000-2008.

Tsai, Lee, and Chiang (2012) investigate the long-run relationship between the housing and stock markets using quarterly data from the U.S. housing price index from 1970-2009. They find that cointegration exists between the markets, and that adjustments toward long-run equilibrium are asymmetric. That is, when stock prices rise rapidly, there will be a delayed but proportionate rise in house prices. However, when stock prices fall, house prices do not tend to fall proportionately or may not fall at all.

Heaney and Srianthakumar (2012) conclude that investment in commercial or residential real estate along with investment in the general stock market could provide considerable diversification benefits. However, conditional correlations between A-REITs and the general stock market returns are quite high and increased further during both the 1987 Wall Street Crash and the 2008 global financial crisis. They use Australia 1986–2009 data.

Hui and Ng (2012) find that the correlation between residential property price and the general stock market index has become weaker over time in Hong Kong between 1990 and 2006.

Casni and Vizek (2014) state that their results suggest that the level of codependence between equity price and real estate price movement is relatively high in all examined country groups (30 developed and emerging economies). However, the degree of codependency varies among

country groups, with the reaction of both asset prices to economic news being more synchronized in economies with a market-based financial system and developed economies. Data ranges from 1970 to 2012.

Yang, Zhou, and Leung (2012) examine S&P 500 stocks daily index returns, US corporate bonds, and their real estate counterparts (REITs and CMBS) for the period 1999 to 2008. They find REITs returns have stronger asymmetric volatilities because of high leverage. They also suggest reduced hedging potential of REITs against the stock market during economic downturns.

Olaleye and Ekemode (2014) find that rates of return for real estate equity and non-real estate equity in Nigeria for the period 1999 – 2011 were related. Real estate equity had a slightly higher return but with more risk.

Liow (2012) examines the change in co-movements over time for eight Asian real estate securities markets and their local stock markets during the period from 1995 – 2009. He studies developed markets in Australia, Japan, Hong Kong, and Singapore and developing markets in China, Malaysia, Taiwan and the Philippines. He finds that real estate stocks correlate with stock markets at local, regional and global levels and vary over time and are asymmetric in some cases.

Oikarinen, Hoesli, and Serrano (2011) develop evidence of cointegration between securitized and direct real estate total return indices in the U.S. from 1977 to 2008. The correlation between the returns for these indices approaches one as the investment horizon lengthens. The long-term similarity seems due to the adjustment of the direct market over time. The two real estate indices are cointegrated with one another but not with the stock market.

Higher liquidity, a greater number of market participants, lower transaction costs, and the existence of a public market place in the securitized market enable the indirect real estate market to be more information efficient than the direct market. The prices of indirect real estate investments should react faster to shocks in the fundamentals than those of direct real estate. Empirical evidence shows that the securitized market leads the direct real estate market (Gyourko & Keim, 1992; Myer & Webb, 1993; Barkham & Geltner, 1995; Li, Mooradian, & Yang, 2009).

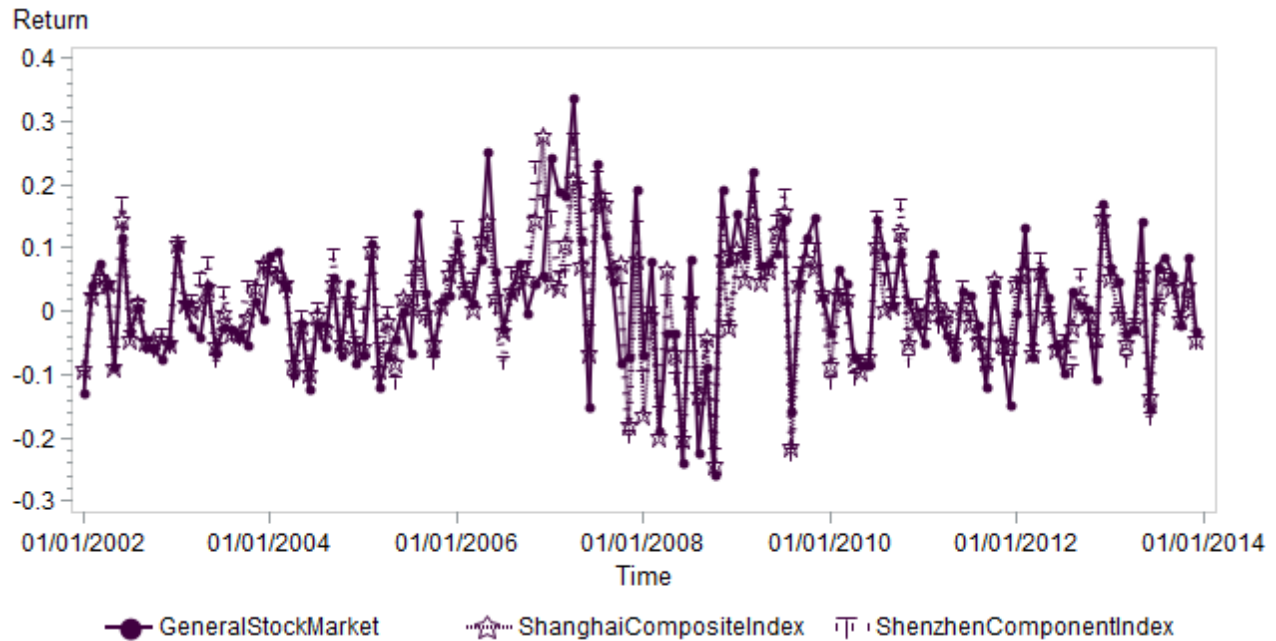
As it can be seen, there are number of studies carried out with new techniques to attempt to detect housing bubbles. There is extensive research on the relationship of direct real estate, securitized real estate, and the general stock market. However, no research has been done to analyze housing bubbles by evaluating various investment channels. We try to bridge the gap between housing bubble research and investment research. We are the first study to analyze housing bubbles by looking at the relationship between direct real estate and other investment channels and to evaluate the performance of the real estate industry. Numerous studies have shown that real estate and the general stock market are integrated (Gao et al., 2012; Su 2011; Tsai et al., 2012; Casni & Vizek, 2014; Olaleye & Ekemode, 2014), which supports the likelihood of a long-run equilibrium between the two. However, there also is research that documents the opposite conclusion. (Lin & Fuerst, 2014; Lin & Lin 2011; Oikarinen et al., 2011). Money supply (Hamburger & Kochin, 1972; Homa & Jaffee, 1971; Keran, 1971;

Rapach, 2001), interest rate (Belke & Beckmann 2015; Andries, Ihnatov & Tiwari, 2014), and risk (Sircar & Sturm, 2015) all affect investment return. Direct real estate, securitized real estate, and the general stock market are exposed to a similar economic environment. Money supply, interest rate, risk, and other factors should affect these three investment channels in a similar way in the long run. We believe that in a rational investment environment, evidence should support the integration of the three markets. We believe that given a similar economic environment, a much higher real estate return would indicate a possible real estate bubble.

III. Methodology

Securitized real estate monthly average return is calculated using China Stock Market & Accounting Research Database (CSMAR) data. Since China does not have a formal REITs market, we use real estate industry stock returns to proxy securitized real estate return. Monthly direct real estate price data is from the National Bureau of Statistics of China. The data range is from 2002-2013. Direct real estate in our study includes both residential and commercial real estate.

General stock market return comes from the CSMAR database. We use monthly average stock return, considering the annual cash dividend reinvestment and including both the Shanghai and Shenzhen stock markets. China has two major stock market indexes which are the Shanghai composite index and the Shenzhen component index. The stock market index data is available through sohu.com. The Shanghai composite index is calculated using all listed stocks and considering total shares outstanding. The biggest drawback of this method is that total shares outstanding includes state owned shares and legal person shares. These shares are not tradable. So using total shares outstanding, instead of tradable shares, distorts the real stock market performance. The Shenzhen Stock Exchange created a different index in 1995, the Shenzhen component index, which uses 40 listed companies and tradable stocks. It gained popularity compared with the old Shenzhen composite index, which is calculated in the same way as the Shanghai composite index. Currently, the most quoted indexes are the Shanghai composite index and the Shenzhen component index. In Figure 1, we plot returns from the general stock market (using data from CSMAR), the Shanghai composite index, and the Shenzhen component index. It is clear that the three stock return indicators coincide. For later comparison of the returns from direct real estate, securitized real estate, and the general stock market, we choose to use the general stock market return from CSMAR since it includes all stocks from both the Shanghai and Shenzhen Stock Exchanges and considers cash dividend reinvestment.

Figure 1: Monthly Stock Market Return

We first test whether time series data is stationary. If time series data is non-stationary, the Johansen trace test should be used to test for cointegration. If time series data is stationary, we can properly use a regression model. Granger-causality tests are applied to identify lead/lag relationship between different time series. The Granger-causality test should be applied to first or higher differences if time-series data is non-stationary. We look at current ratio and debt to asset ratio to evaluate the industry's solvency and flexibility. We look at sales, net income, and return on equity to evaluate the industry's profitability. To investigate industry growth, we look at income growth and capital growth. For income growth, we use sales and net income growth rate. For capital growth, we look at total liability and total equity growth rate.

IV. Results

Figure 2 plots returns from direct real estate, securitized real estate, and the general stock market. As mentioned above, for this comparison we use the general stock market return from CSMAR since it includes all stocks from both the Shanghai and Shenzhen Stock Exchanges and considers cash dividend reinvestment. The plot shows no evidence of drift. Securitized real estate and the general stock market show similar patterns, while direct real estate appears to have a different pattern.

Figure 2: Real Estate vs. Stock Market Performance

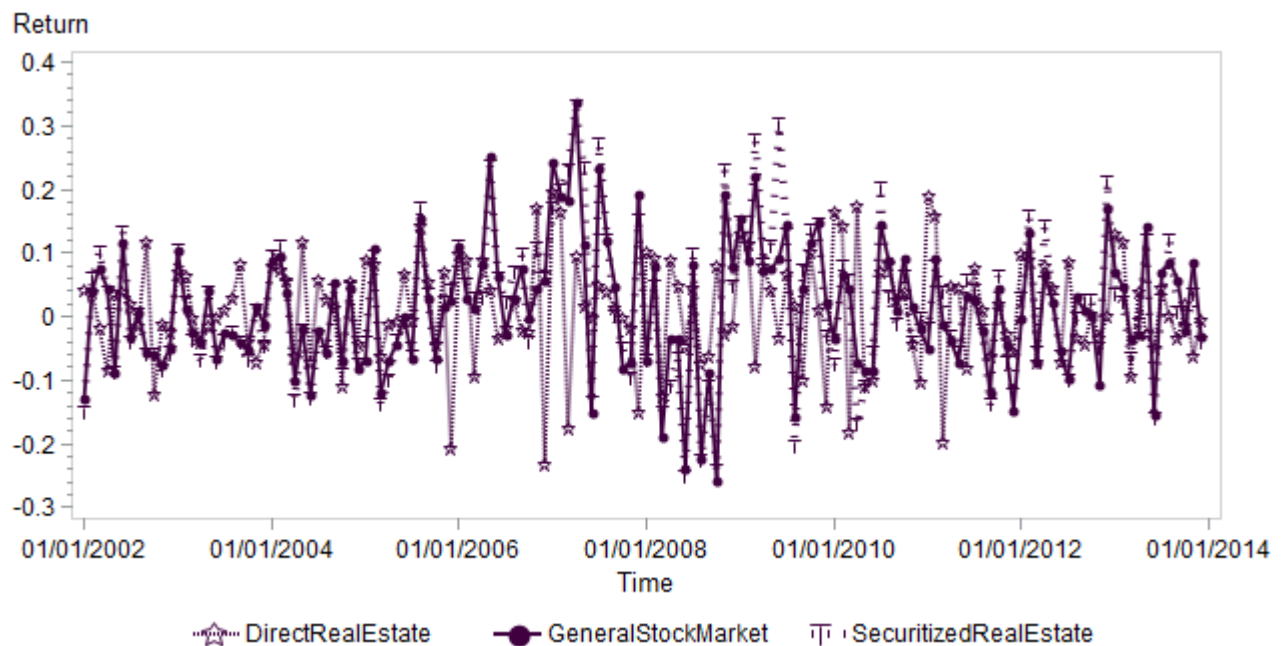


Table 1 shows descriptive statistics for the three sets of time series data. Securitized real estate has higher performance compared with direct real estate and the general stock market. Securitized real estate median monthly return is an astonishing 2.17%, while both direct real estate and the general stock market have a 1.34% median monthly return. The means and medians of the three types of investment returns are not significantly different from each other.

Table 1: Monthly Return Descriptive Statistics (2002-2013)

Statistics	Direct Real Estate	Securitized Real Estate	General Stock Market
Average	1.02%	1.49%	1.45%
Median	1.34%	2.17%	1.34%
Std. Dev	0.0838	0.1106	0.1005

The Dickey-Fuller procedure is used to test the null hypothesis that the series is non-stationary. If the p value is <0.05, then the null hypothesis is rejected, and the data is considered stationary. Dickey-Fuller Unit Root Tests, which are presented in Table 2, show that the three sets of time series data are stationary. Augmented Dickey-Fuller Unit Root Tests results are consistent with Dickey-Fuller Unit Root Tests. Since the time series data is stationary, we proceed with regression models.

Table 2: Dickey-Fuller Unit Root Tests

Variable	Type	Rho	Pr < Rho	Tau	Pr < Tau
Securitized Real Estate	Zero Mean	-86.83	<.0001	-6.55	<.0001
	Single Mean	-90.78	0.0012	-6.67	<.0001
	Trend	-91.27	0.0005	-6.66	<.0001
Direct Real Estate	Zero Mean	-416.69	0.0001	-14.34	<.0001
	Single Mean	-468.17	0.0001	-15.10	<.0001
	Trend	-468.35	0.0001	-15.05	<.0001
General Stock Market	Zero Mean	-89.08	<.0001	-6.63	<.0001
	Single Mean	-93.90	0.0012	-6.79	<.0001
	Trend	-94.33	0.0005	-6.78	<.0001

Adjusted R-Square shows that 90% of the change in the securitized real estate return is explained by the general stock market. Only 5% of the direct real estate return is explained by the general stock market. The results are shown in Table 3.

Table 3 Real Estate & General Stock Market

	Securitized real estate & general stock market				Direct real estate & general stock market			
	Overall model: $p < 0.0001$. Adjusted r-square: 0.8986.				Overall model: $p = 0.0043$. Adjusted r-square: 0.0492.			
Variable	Parameter Estimate	Standard Error	t Value	Pr > t	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	-0.0001	0.0030	-0.05	0.9625	0.0074	0.0069	1.070	0.2867
GeneralStockMarket	1.0433	0.0293	35.62	<.0001	0.1969	0.0680	2.900	0.0043

The Granger causality test is a statistical hypothesis test to determine whether one time series is useful in forecasting another. The null hypothesis is no Granger causality. Table 4 shows Granger causality results. Direct real estate leads the general stock market with very little feedback from the general stock market to direct real estate. This confirms the importance of direct real estate in the Chinese economy. The direct real estate market is generally considered less information efficient than the securitized market. The direct real estate returns may lag those of the indirect market (Gyourko & Keim, 1992; Myer & Webb, 1993; Barkham & Geltner, 1995; Li et al. 2009). However, our results indicate that this is not true in China for the period 2002 - 2013. The null hypothesis that there is no Granger causality between real estate securities and direct real estate is not rejected, thus returns from real estate securities and direct real estate are not useful in forecasting each other. Granger causality tests show that returns from securitized real estate and the general stock market are not useful in forecasting each other.

Table 4: Granger Causality Test

Group 1	Direct real estate	Securitized real estate	General stock market	Direct real estate	General stock market	Securitized real estate
Group 2	Securitized real estate	Direct real estate	Direct real estate	General stock market	Securitized real estate	General stock market
Chi-Square	0.61	0.39	16.54	10.98	6.65	6.18
Pr > ChiSq	0.4364	0.5327	0.0054	0.0517	0.0839	0.1033

Table 5 shows the basic financial information of the real estate industry and other industries after deleting observations outside of the 95% quartile. For the debt to asset ratio, net income and return on equity, the means and medians are both significantly different for the two groups at $p < .01$. Net income growth mean and median are significantly different for the two groups at $p < .05$ and $p < .01$, respectively. Compared with other industries, the real estate industry is more heavily leveraged (median debt to asset ratio 65% vs. 47%). The real estate industry has a higher return on equity compared with other industries (median 7.87% vs. 6.89%). The real estate industry has a much higher net income growth rate compared with other industries (median 10.03% vs. 6.14%). However, real estate and other industries' sales growth mean and median are not significantly different. We can only speculate that the real estate industry has become more efficient over time or real estate prices have been rising faster than building costs. Further research should be done to investigate labor costs and raw material costs and how these affect different industries.

Table 5: Financial Analysis

Variable	Real Estate Industry			Other Industries		
	Mean	Std Dev	Median	Mean	Std Dev	Median
Current ratio	1.7230	0.8450	1.5333*	1.6808	1.1034	1.3426*
Debt asset ratio	0.6194*	0.1436	0.6471*	0.4617*	0.1708	0.4692*
Operating revenue	2,121,166,050	2,187,571,459	1,416,917,662	2,280,932,389	2,616,665,837	1,341,674,441
Net income	187,989,204*	206,725,287	101,216,401*	126,675,672*	157,493,739	67,557,689*
Return on equity	0.0871*	0.0576	0.0787*	0.0781*	0.0535	0.0689*
Sales growth	0.1918	0.3508	0.1497	0.1755	0.2367	0.1488
NI growth	0.1095**	0.6534	0.1003*	0.0469**	0.6935	0.0614*
Total liability growth	0.2216	0.2987	0.1645**	0.2034	0.3009	0.1416**
Total equity growth	0.1125	0.1672	0.0667*	0.1014	0.1594	0.0551*

*significant at $p < .01$

**significant at $p < .05$

V. Conclusion

The Chinese real estate industry shows excellent profitability through 2013. Its net income, return on equity, and net income growth are significantly higher than other industries. However, the real estate industry has a 65% debt to asset ratio, compared with 47% for other industries. The real estate industry's high leverage can pose potential risk to investors, especially when facing economic downturns.

Although securitized real estate appears to be closely related to the general stock market, direct real estate has its own pattern. Investors, especially short term investors, may be able to benefit by investing in direct real estate to add diversity to their investment portfolios. In the long run, we find that direct real estate leads the general stock market. The return rates of the three types of investments are not significantly different from each other in the long run.

Overall, our evidence seems to show integration of the three markets. Contrary to general belief, we do not believe China's direct real estate or securitized real estate are overheating compared with other industries. The average monthly returns are very high for China investment, whether in direct real estate, securitized real estate, or the general stock market. Securitized real estate does have a higher return compared with direct real estate and the general stock market, but the difference is not statistically significant. All three types of investments have a monthly return

higher than 1%. The Chinese economy, with such astonishing investment returns, does face the threat of overheating. We believe this threat is not limited just to the real estate industry, but rather relates to the whole economy.

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