Is the Real Estate Industry Squeezing Out the Manufacturing Industry? -The China Experience

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[Abstract] This study uses 2002-2013 Chinese publicly listed companies' data to evaluate the effect of the rising real estate industry on China's manufacturing industry. We look at stock returns and the financial health of both industries. Overall, we find no evidence that the real estate industry is negatively affecting the manufacturing industry. The two industries' returns are highly correlated (93%) and have similar patterns. Both industries have excellent returns on equity (>7%). Both industries' sales and liability growth rates are in the double digits. The biggest difference between the two industries is in the debt to asset ratio. The real estate industry has a much higher leverage (close to two thirds) than the manufacturing industry's less than 50%. We are more concerned with the long term viability of the real estate industry. In an economic downturn, with such high leverage, the real estate industry's ability to adjust is questionable.

[Keywords] Manufacturing; real estate; China; stock return; leverage

Introduction

According to a post on CNN Money on 11/11/2014, investors worldwide are now able to buy shares of Chinese companies listed on the Shanghai stock exchange. Even though the purchase process is a bit complicated, Donald Amstad of Aberdeen Asset management calls this, "a very, very important day for China and for the world financial system." As investment in Chinese companies becomes more and more available to investors across the globe, it becomes even more important to have information about the Chinese economy and Chinese companies. In this paper, we investigate the impact of the hot Chinese real estate industry on the manufacturing industry in China.

China overtook the U.S. as the world's largest manufacturing nation in 2010. The United Nations reported in 2011 that China has the largest manufacturing industry in the world by an increasing margin. Despite the encouraging news, there are many outcries in China about how the overheating real estate industry has halted the manufacturing industry. Alini (2013) claims this happened in France during the period 2000 – 2007 and may have been the cause of the loss of 328,000 jobs in the manufacturing industry in Canada from 2002-2008.

Industry leaders in China expressed their concerns in the "China Enterprise Competitiveness Annual Meeting" in 2012. A comment by Simcere Pharmaceutical Group founder and Chairman Ren Jinsheng said that, "we can pick up business innovation only if the real estate economy cools down," which represented the manufacturing industry leaders' thought. The consensus is that the real estate economy has sucked innovative resources from the manufacturing industry. So, is China's manufacturing industry booming or is it suffering?

According to the World Bank, China's manufacturing value added as a percent of GDP was above 32% from 2004-2009. It dropped to 29.62% in 2010. It was last measured at 30.57 in 2011. China's global account surplus surged after 2004. It rose from 2.8% of GDP in 2003 to 10.8% in 2007. Many economists and countries argue that the RMB needs to appreciate to rebalance China's trade. Since 2003, the Chinese government has been trying to narrow external surpluses through measures such as allowing modest appreciation of the currency. The RMB has slowly appreciated against the US dollar from 8.2770 in 2003 to around 6.23 in May, 2014. In 2013, China's surplus dropped to 2% of GDP. On the surface, it seems that currency appreciation did help to balance the trade surplus. However, empirical evidence on

the effects of an RMB appreciation on China's exports has been mixed for the largest category of exports, processed exports (Thorbecke & Smith, 2010; Cheung et al., 2010; Thorbecke, 2011). While we acknowledge that exchange policy might have contributed to China's decreasing trade surplus, we suspect that the difficulty of the manufacturing industry to compete with the real estate industry for capital also has contributed to the decreasing trade surplus.

Based on manufacturing value added as a percent of GDP and China's global account surplus, China's manufacturing industry might not be as strong as United Nations has described. This research is the first to investigate the effect of the rising real estate industry on China's manufacturing industry. We look at the effect both in terms of stock returns and the financial health of both industries. First, we investigate the monthly stock returns for the two industries. We then look at various financial ratios and the growth rate of the two industries. If the real estate industry has negatively affected the manufacturing industry, we should detect evidence that returns and total activity in the manufacturing sector have declined.

Literature Review

Previous research has focused on land supply and how it affects development. The current land supply model causes inter-regional tension and constrains development (Wang, Potter & Li 2014; Wang 2014). Administrative allocation of land to state-owned enterprises will continue (Ho & Lin 2003). Will state-owned enterprises' allocated land put private enterprises at a systematic disadvantage? This paper does not address this issue. We will do a follow up study on this issue.

Real Estate and Manufacturing Industry

Alini (2013) documents manufacturing in France and Canada suffered when the housing market was booming. Yang et al. (2014) studied 23 different industries in China for the period July 13, 2006 – October 13, 2009, to analyze the impact of the 2008 financial crisis on each industry. They found that neither the manufacturing industry nor the real estate industry was very much affected by the crisis, largely due to the Chinese government's swift action to modify economic policies and stimulate domestic demand by increasing public expenditures.

Cheng (2012) studied the impact of globalization on the Shanghai economy from 1843 to 2013, including the impact on manufacturing oriented versus service oriented industries, including real estate. He states that it is common for cities to start to emphasize the service sector more as they mature because services usually create greater added value and require fewer resources. He mentioned that Shanghai followed this path with great success starting in the 1980s and that "Thousands of manufacturing factories disappeared from downtown Shanghai and were replaced by numerous fancy malls, high-rise apartment complexes, and modern office buildings… ". However, even though there has been a change in emphasis, Shanghai continues to value and support manufacturing and continues to view it as essential to their continued economic success.

Real Estate And General Stock Market

We do find abundant research regarding real estate and the general stock market. Manufacturing is the biggest sector of the Chinese stock market: 1,847 of the 2,719 listed firms are in the manufacturing sector and 201 are in the real estate sector as of the end of 2013. These studies regarding real state and the general stock market shed light on real estate and manufacturing, manufacturing being the biggest component of the Chinese general stock market. Lin and Lin (2011) find no causality relationship between the stock and real estate markets in China from March 1995 to June 2010. They gave several reasons for this and suggested using the indexes of different regions or cities for further concise conclusions.

Gao, Li, and Gu (2012) conclude that the Chinese direct real estate market and the stock market are integrated during the study period 1999-2009. This conflicts with Lin and Lin (2011).

Hui and Ng (2011) find that the correlation between residential property prices and the stock index has become weaker over time in Hong Kong between 1990 and 2006. 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 real estate-stock correlations at the local, regional, and global levels that vary over time and are asymmetric in some cases.

Tsai, Lee, and Chiang (2012) investigated 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 housing prices. However, when stock prices fall, housing prices do not tend to fall proportionately or may not fall at all.

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. Casni and Vizek (2014) state that the 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 co-dependencies 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. We can see that most research does conclude that there is cointegration between the real estate and the general stock market with few exceptions.

Methodology

Data Collection

The data come from China Stock Market and Accounting Research Database (CSMAR). The data range is from 2002-2013.

Johansen trace test, and Granger-causality test. We use monthly returns from 2002-2013. We will first test whether time series data is stationery. If time series data is non stationary, the Johansen trace test will be used to test for cointegration. If time series data is stationary, cointegration test is unnecessary. Simple Pearson correlation analysis is sufficient. Granger-causality test will be applied to identify any lead/lag relationship between the two sets of time series data. The Granger-causality test will be applied to first or higher differences if time-series data is non-stationary.

Financial Health Evaluation. We look at current ratio and debt to asset ratio to evaluate each industry's solvency and flexibility. We look at sales, net income, and return on equity to evaluate each industry's profitability. To investigate industry growth, we look at income and capital growth. For income growth, we use sales and net income growth rates. For capital growth, we look at total liability and equity growth rates.

Results

Figure 1 is the plot of real estate and manufacturing industry monthly returns. We do not see a drift in the plot. The two industries returns have similar patterns throughout the years. We suspect the general Chinese and global environment affects the two industries similarly.

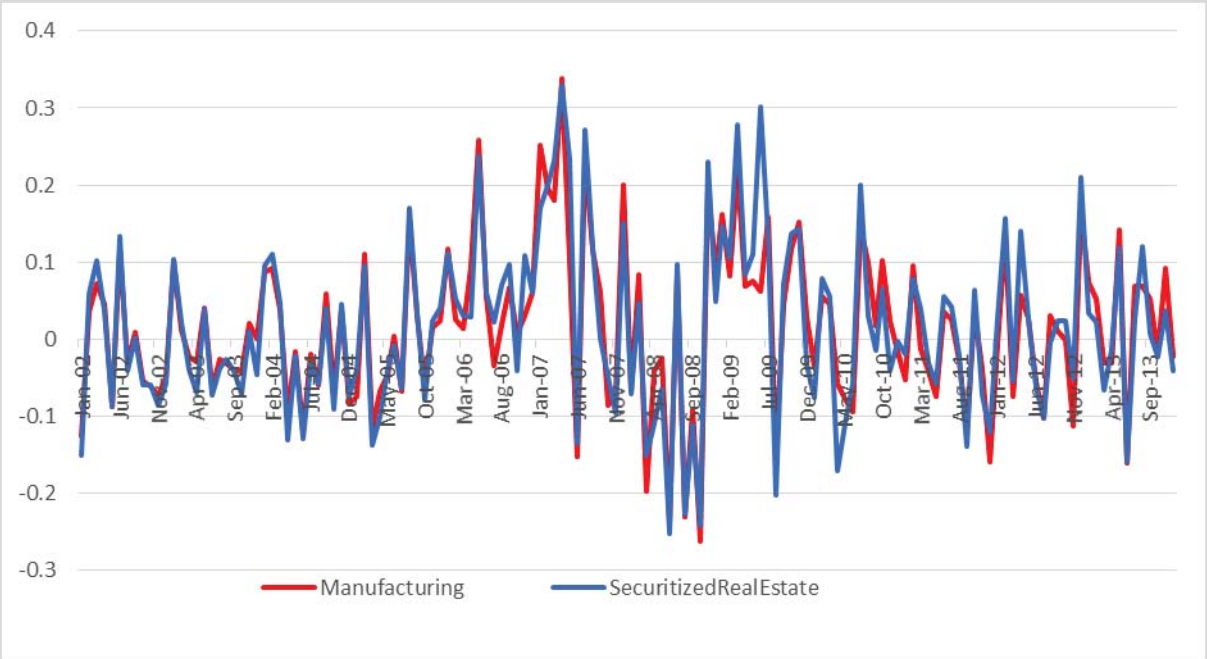

Figure 1. The plot of real estate and manufacturing industry monthly returns

Table 1 shows descriptive statistics for the two industries' monthly stock returns. Although both industries have impressive returns, the real estate industry has a median monthly return of 2.17%, which is much higher than the manufacturing industry's 1.62% median monthly return. The real estate industry also has a slightly higher average monthly return of 1.49%, compared with manufacturing industry's 1.46%.

Table 1. Descriptive Statistics (2002-2013)

Statistics	Real Estate	Manufacturing
Average monthly return	1.49%	1.46%
Median monthly return	2.17%	1.62%
Std. Dev	0.1106	0.10133

The Dickey-Fuller procedure is used to test the null hypothesis that a series is non stationary. If the p value is <0.05, then the null hypothesis is rejected, indicating that the data is stationary. Dickey-Fuller Unit Root Tests, presented in Table 2, show that the two time series data are stationary. Augmented Dickey-Fuller Unit Root Tests results are consistent with Dickey-Fuller Unit Root Tests.

Table 2. Dickey-Fuller Unit Root Tests (Monthly Return, 2002-2013)

Variable	Type	Rho	Pr < Rho	Tau	Pr < Tau
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
Manufacturing	Zero Mean	-88.91	<.0001	-6.62	<.0001
	Single Mean	-93.76	0.0012	-6.79	<.0001
	Trend	-94.05	0.0005	-6.77	<.0001

Since the time series data is stationary, we proceed with Pearson correlation procedure. The result is

shown in Table 3. The two variables are strongly correlated (R-square=0.9327). This result is consistent with Figure 1.

Table 3. Pearson Correlation Coefficients ((Monthly Return, 2002-2013)

	Manufacturing	RealEstateSecurities
Manufacturing	1.0000	0.9327
Manufacturing		<0.0001
Real Estate	0.9327	1.0000
Real Estate	<0.0001	

The Granger causality test is a statistical hypothesis test to determine whether one time series is useful in forecasting another. Since the data is stationary, we do not need to apply this test to first or higher differences. The null hypothesis is no Granger causality. In Table 4, the null hypothesis is not rejected; thus returns from the real estate industry and the manufacturing industry are not useful in forecasting each other. Thus, the two series move in the same direction at the same time as indicated in Table 3, but they do not forecast one another.

Table 4. Granger Causality Tests

Test 1		Test 2	
Group 1	Manufacturing	Group 1	Real estate
Group 2	Real estate	Group 2	Manufacturing
Chi-Square	6.70	Chi-Square	6.57
Pr > ChiSq	0.0820	Pr > ChiSq	0.0870

Table 5 shows the basic financial information of the real estate and manufacturing industries for the entire 11 year period. Tables 6-10 show annual data. Tables 5-10 show data after deleting observations outside of the 95% quantile. Tables 6-10 show annual data for 5 of the Table 5 variables because these variables seem to add additional information, while the other variables annual data did not seem to yield useful information. Debt to asset ratio and net income mean and median are both significantly different for the two groups at $p<.01$. The real estate industry is much more heavily leveraged than the manufacturing industry (median debt to asset ratio 63% vs. 45%). The real estate industry has median net income of RMB80,335,180 compared with the manufacturing industry's RMB67,858,180.

We also look at annual data for each ratio. The ratios vary greatly year by year for both industries but follow a similar pattern. In 2008, the ratios for both industries deteriorated, which is also consistent with the monthly returns we show in Figure 1. Both industries have the lowest returns in 2008. Overall, we see no evidence that the real estate industry is affecting the growth of the manufacturing industry. This is further illustrated in Tables 7 to 10. Even though Net Income, Total Assets, Total Liabilities, and Total Equity has had a growth spike from 2010 – 2013 for the real estate industry, the manufacturing industry has stayed quite stable in all these areas. This indicates that the real estate industry has grown substantially over this period. However, this does not seem to be affecting the health of the manufacturing industry. Thus, the real estate industry does not seem to be squeezing out the manufacturing industry and is not growing at the expense of the manufacturing industry.

Tables 6 and 10 show that both the amount of liabilities and the growth in liabilities have remained remarkably stable in the manufacturing industry. This could be because manufacturing is a relatively mature industry in China. In contrast, the amount of liabilities have increased substantially, and the growth rate has been erratic in the real estate industry. Both industries have rates of return on equity

above 7%, which is a very good return. Their sales, net income, total liability, and total equity growth rates are not significantly different from each other.

*Table 5. Financial Analysis (*Sales and net income unit is RMB)

Variable	Real Estate Industry			Manufacturing Industry		
	Mean	Std Dev	Median	Mean	Std Dev	Median
Current ratio	1.5975	0.5946	1.4823	1.6034	0.7489	1.4081
Debt asset ratio	0.5964*	0.1096	0.6256*	0.4524*	0.1422	0.4547*
Sales	1,573,441,080**	1,120,967,892	1,231,727,077	1,801,504,569**	1,485,360,088	1,312,862,773
Net income	131,117,910*	120,310,843	80,335,180*	99,604,737*	92250368	67,858,179*
Return on equity	0.0784	0.0447	0.0749	0.0759	0.0420	0.0702
Sales growth	0.1534	0.1961	0.1294	0.1665	0.1706	0.1511
NI growth	0.0990	0.3703	0.0840	0.0783	0.4118	0.0753
Total liability growth	0.1969	0.2458	0.1455	0.2015	0.2289	0.1618
Total equity growth	0.0757	0.0809	0.0568	0.0737	0.0785	0.0534

*significant at p<.01
**significant at p<.05

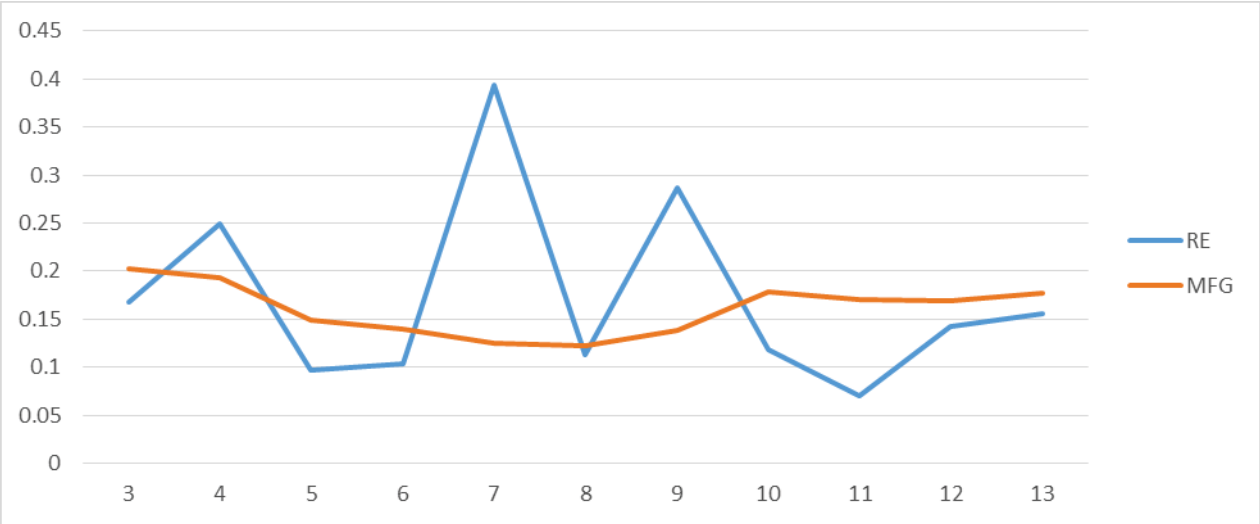

Figure 2. Total liability growth

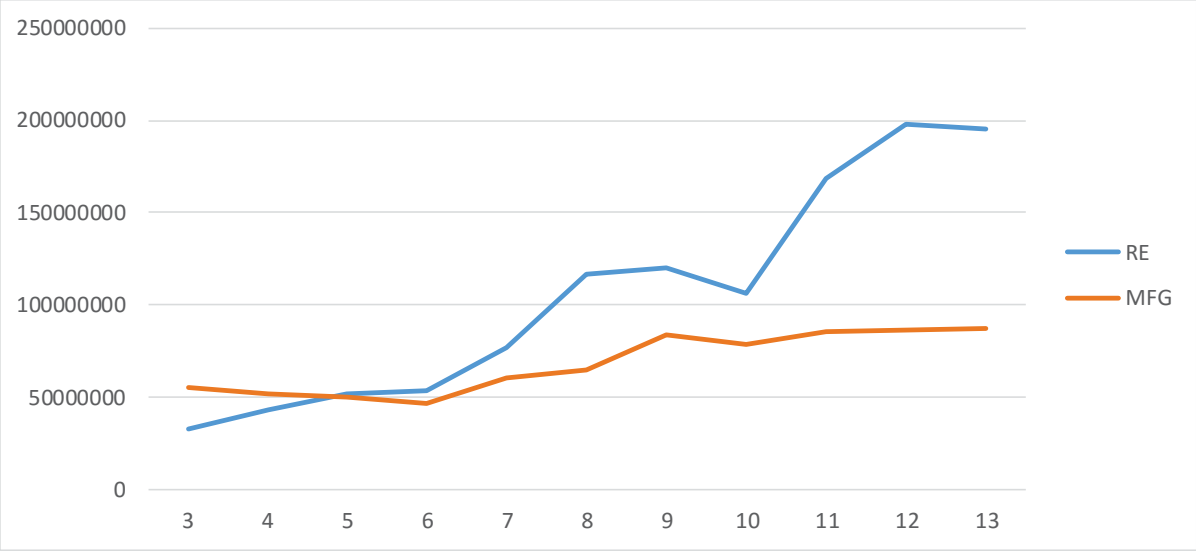

Figure 3. Net income

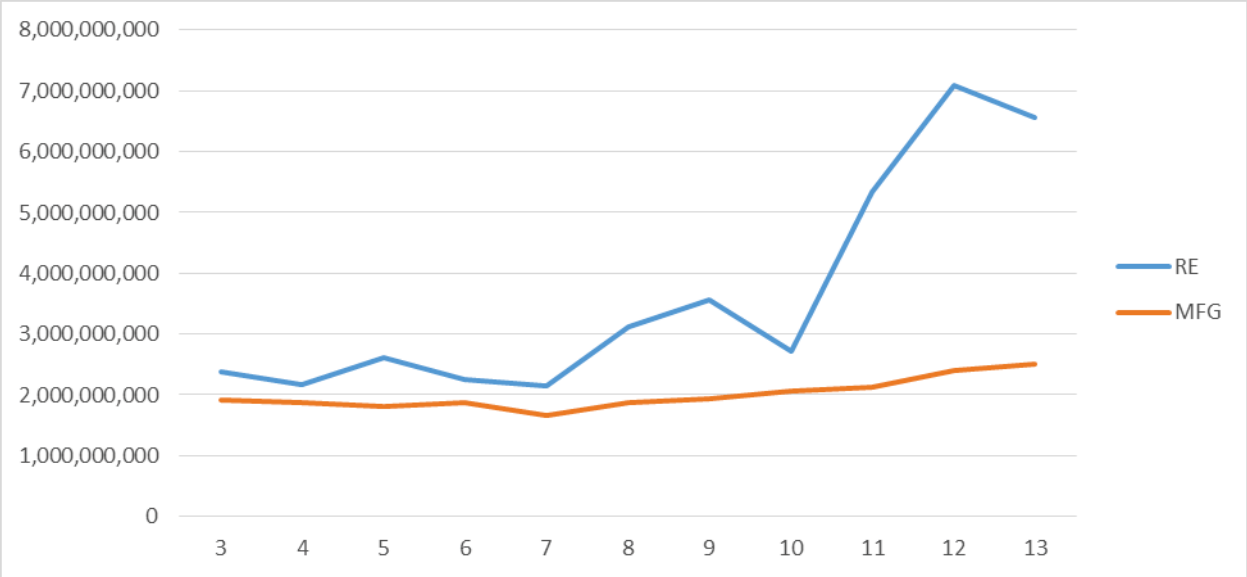

Figure 4. Total assets

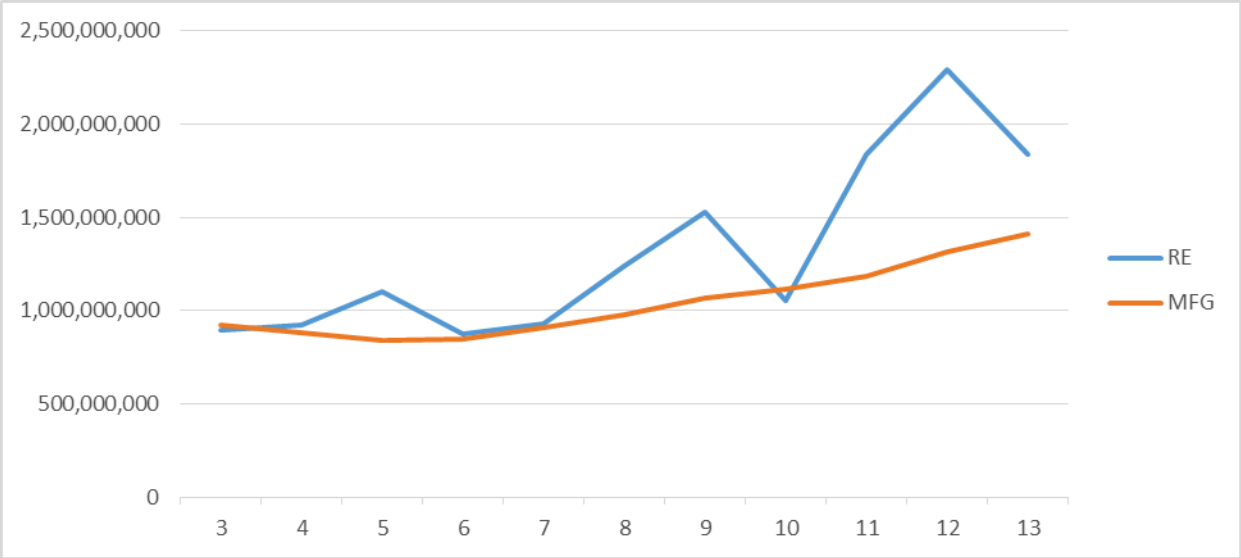

Figure 5. Total equity

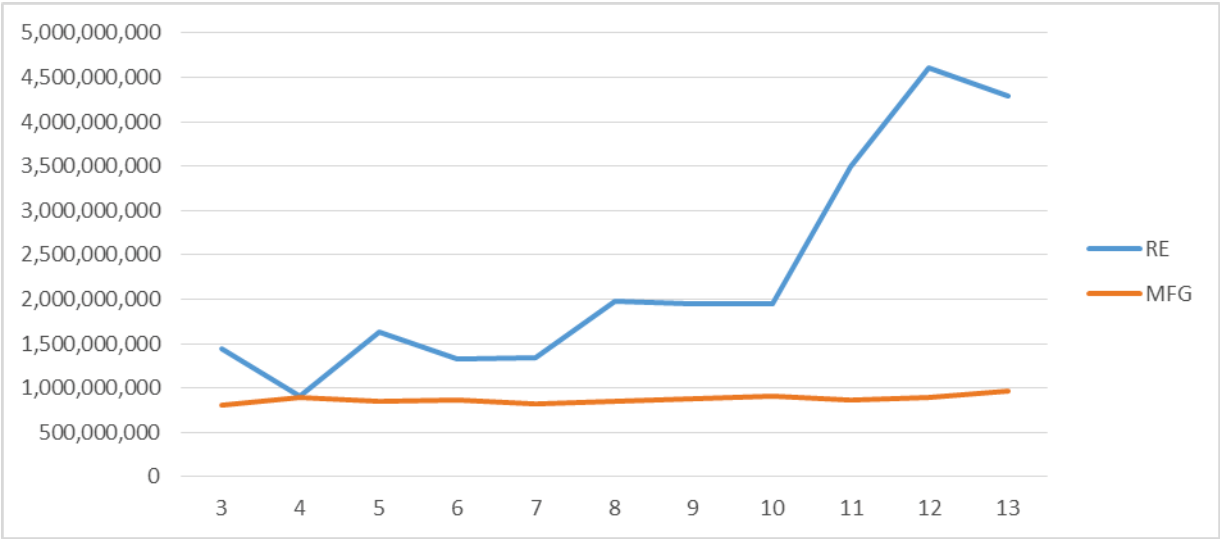

Figure 6. Total liabilities

Conclusion

Overall, we find no evidence that the real estate industry is negatively affecting the manufacturing industry. The real estate industry does have a slightly higher rate of return. However, the two industries' returns are highly correlated (93%) and have similar patterns. If the real estate industry was negatively affecting the manufacturing industry, we should observe different instead of similar patterns. Both industries have excellent returns on equity (>7%). Both industries' sales and liability growth rates are in the double digits, with manufacturing industry's sales and liability growth rates slightly higher, although the differences are not statistically significant. The biggest difference between the two industries is in the debt to asset ratio. The real estate industry has a much higher leverage (close to two thirds) than the manufacturing industry's less than 50%. We are more concerned with the health of the real estate industry. In an economic downturn, with such high leverage, the real estate industry's ability to adjust is questionable.

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