Hollowing Out of the Real Economy: Evidence from China's listed firms

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January 2016

Abstract

The paper studies an often-observed phenomenon of diversification of manufacturing firms into real estate development in East Asian economies. Utilizing a sudden change in China's accounting standards that requires firms to disclose information about their real estate holdings for investment purpose (or investment property), we examine both the impact of such diversification on firms' investment in their original business and the stock market response to such diversification. Our results confirm there exists underinvestment in original business (or hollowing out of the real economy) for firms diversifying into real estate, and that there is a lack of investor response to such diversification, in both short-run and long-run. Our study calls for further study on the role of real estate development in the long-run competitiveness of developing economies.

Keywords: investment property, hollowing out of real economy, stock market returns

*This paper is dedicated to Professor Gregory Chow to celebrate his eighty-fifth birthday.

1 Introduction

Rapid economic growth is often coupled with booming real estate market, particularly in Asian countries and regions, such as Japan, Hong Kong and Taiwan.[1] In China, the real estate assets appreciate rapidly along with the fast growth of the economy as well. For example, according to Wang and Zhang (2014), the average real estate sale price across 35 major Chinese cities has increased by 10 percent annually between 2002 and 2008. Wu, Deng and Liu (2014) construct a new housing price index of China which shows a huge disparity between housing price and household income, indicating a very risky picture of Chinese housing market. Anecdotal evidence[2] suggests that the profit opportunity in China's real estate market has attracted non-real estate firms to divert their investment away from original business to real estate for investment purpose (henceforth, *investment property*).[3]

Existing studies using data from developed countries find that the rising real estate prices might have positive impacts on corporate investment through the collateral channel. Namely, when facing financing constraints, firms can use pledgeable assets (particularly real estate) as collateral to obtain financing for new investments.[4] Using a sample of representative U.S. firms from 1993 to 2007, Chaney, Sraer, and Thesmar (2012) find evidence supporting this view and quantify the association between firms' corporate investment with the gain in the collateral value of real estate (a \$0.06 investment out of each \$1 collateral). However, Wu, Gyourko, and Deng (2015) find that, for Chinese listed firms, real estate value has no impact on total investment via the collateral channel. They conjecture that Chinese listed firms (especially SOEs) might not necessarily be financially constrained and required to pledge collateral for investment.

Some commentators conjecture that investment property could be the ends, rather than the means for further manufacturing investment. In other words, investment property by manufacturing firms may imply a diversion of resources away from original business and hence an underinvestment in original business (*hollowing out of the real economy*). Indeed, a recent theoretical study by Chen and Wen (2014) shows that growing housing bubble may induce productive entrepreneurs to speculate in housing market, thus crowding out their productive investment. This might explain the muted impact of real

[1] For example, Nakajima (2008) uses a dynamic stochastic general equilibrium model to explain the dramatic asset price changes in Japan from 1980 to 2000. Gerlach and Peng (2005) study the relationship between Hong Kong's residential property prices and bank lending, and suggest that the property prices affect bank credit rather than conversely. Chen (2001) examines the asset price fluctuations in Taiwan from 1973 to 1992, documents that equity prices Granger-cause real estate prices, and finally finds that bank loan, rather than interest rates, plays an important role in predicting the movements of both real estate and equity prices. Liu, Park and Zheng (2002) show that housing investment is procyclical and is an important factor for short-term economic growth in China.

[2] Prominent examples of non-real estate firms diversifying into real estate include Youngor (a leading garment company, http://in.reuters.com/article/2008/03/07/china-youngor-property-idINPEK24290620080307, accessed 29th April 2015), Kweichow Moutai (a leading liquor company, http://www.scmp.com/property/international/article/1355179/kweichow-moutai-ventures-european-real-estate, accessed 29th April 2015), and Suning (a leading electronics retailer, http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20130103000007&cid=1206, accessed 29th April 2015).

[3] Deng, Morck, Wu, and Yeung (2011) find that China's seemingly highly effective macroeconomic stimulus package introduced after 2008 financial crisis may well have induced the centrally-controlled state-owned enterprises (or SOEs) to overbid in the land auction substantially, undertake investment property mistakenly, and fuel a real estate bubble.

[4] See, for example, Barro (1976); Stiglitz and Weiss (1981); and Hart and Moore (1994).

estate collateral on total investment (which is a sum of the increasing investment real estate and decreasing investment in original business) found by Wu et al. (2015). Moreover, the substitution of investment from original business to investment property would negatively impact on the competitiveness of the real economy, and expose the concerned firms to greater risks as real estate value is pro-cyclical and its asset irreversibility is high. Despite the appealing nature of this conjecture, there is no rigorous study along this line.

In addition, it is debatable how investors would react to firms' diversification into real estate. The existing findings are inconclusive. One school of researchers suggest that firms with higher real estate holdings enjoy higher expected return. Tuzel (2010) offers a general equilibrium model of an economy where firms apply two capitals: real estate capital and other capital. The key in the model is that these two types of capitals face different adjustment costs, specifically, real estate capital involving higher adjustment costs. Therefore, firms with more real estate investments bear higher risks, for which investors demand higher expected returns. Empirically, Tuzel (2010) shows that, even after controlling for other risk factors, the returns of firms with a high share of real estate capital exceed those of firms with a lower share of real estate capital by 3-6% annually. On the other hand, Du, Leung and Chu (2014) find no evidence that corporate real estate holdings will enhance returns with a sample of U.S listed firms, while they find that, for firm with weaker corporate governance, corporate real estate holdings could be a form of managerial "empire building".

Indeed, there are two challenges of investigating the impact of diversification into real estate on firm investment behavior and stock market response. First, previous research utilizing data from the United States suffers from the lack of breakdown data on investment property and those real estate holdings for production purpose.[5] Second, firms' voluntary announcement of investment property is endogenous in nature, thereby complicating the analysis on the impact of such investment on stock market returns. This study makes an attempt to address the above two concerns in investigating what is the impact of investment property on firm's investment in original business and how such investment affects stock market returns. The answer to these questions holds importance for firm strategy and economic competitiveness.

Our data come from a sample of China's publicly listed firms for the 2007 - 2013 period. The case of China is interesting because of the prevalence of manufacturing firms diversifying into real estate holdings for investment purpose. For non-real estate listed firms (i.e., excluding those in real estate and construction), about 40% of them have investment property on their balance sheet. More importantly, there was an exogenous change in the accounting requirement for Chinese listed companies. From January 1, 2007, all Chinese listed firms have been required to follow newly revised accounting standards issued by the Chinese Ministry of Finance and disclose their real estate holdings for investment purpose, which includes any land and buildings held for rental income and/or for capital appreciation purpose. These assets used to be included in Property, Plant and Equipment (PPE) and are now taken out from PPE. The sudden change in the financial reporting regulation in China forced all listed firms that already had investment property

[5]The U.S regulatory authority (Financial Accounting Standards Board, FASB) did propose to add Investment Property Entities as a separate item in the U.S accounting standards in 2010. During the process of obtaining feedback from stakeholders, FASB realized that the majority of comments received from constituents were negative to such a proposed change. As a result, the motion was finally withdrawn after four years' debate and negotiation. Data on investment property are available, though, for most European countries.

to report their holdings from the first quarter of 2007. This affords a unique opportunity for us to alleviate the concern of endogeneity problems (i.e., selective reporting by firms of its investment property only when this is to their advantage) when examining the impact of investment property on stock market return.

Using the sample of firms, we document that firms with investment property experience annually under-investment in their original business by about 10% compared to the industry benchmark, confirming the conjecture of hollowing out of the real economy in China. Our result is in contrast to the findings reported in the existing studies that do not differentiate investment property from other real estate holdings. It might offer an explanation for the lack of evidence for the collateral channel in Chinese listed firms found by Wu et al. (2015). Moreover, our study shows that there is little impact of investment property on the stock market responses, suggesting that investors are not keen on non-real estate firms diversifying into real estate. Further cross-sectional analysis reveals moderate impacts of state ownership of enterprises and regional institutional quality in the relationship of investment property and stock return. Our results suggest that, in the setting of China, the diversification discount associated with investment property could be offset by the stock market premium required for holding less reversible assets, and provide a new perspective on the relation between firms' real estate investment and future stock returns.

Our paper is the first one to explore the investment property item on financial statements of Chinese listed firms, so that we can provide firm-level evidence of the impact of investment property. We believe that our study can motivate future research to further explore the unique Chinese financial disclosure requirement and enrich the literature on real estate investment.

The remainder of the paper is organized as follows. Section 2 discusses data and empirical estimation strategy, while Section 3 presents the main empirical findings. The paper concludes with Section 4.

2 Data and econometric specifications

As the mandatory disclosure of investment property required by Chinese Ministry of Finance became effective in the first quarter of 2007, we restrict our analysis to 2,489 firms that were traded for at least two years in China A-share stock market over the period of 2007-2013. Furthermore, to focus on the diversification into investment property by non-real estate firms, we exclude 197 firms in real estate and construction sectors, which, according to the industry classifications of China Security Regulatory Commission (CSRC) issued in 2012, are those firms with industry codes starting with "E" (construction) or "K" (real estate). We also exclude 5 firms in 2 industries with very few observations (specifically, less than 5 firms). Observations with missing monthly stock returns, total asset, or property, plants and equipment (PPE) are also excluded.

Data on stock returns and financials of our sample firms are obtained from China Stock Market and Accounting Research (CSMAR) database. The number of our sample firms grew from 1,474 in 2007 to 2,280 in 2013. According to the financial reports of those firms, the number of sample firms with investment property increased from 558 in 2007 to 948 in 2013.

To illustrate the growing trend of diversification into investment property from 2007

to 2013, we focus on a sample of 1,345 firms that were listed before the end of 2006.[6] As shown in Table 1, the proportion of firms with investment property in this sample increased from 39.63% in 2007 to 50.91% in 2013. The value of investment property as a share of total assets decreased slightly from 4.4% in 2007 to 3.2% in 2013. In summary, the investment property becomes more common over time among the Chinese listed firms, while the average percentage of investment property in the total assets slightly decreases.

We use two methods to examine whether firms with investment property underinvest in their original business (or the real economy).

In the first approach, we use the following specification (Richardson, 2006; Dou, 2013) to estimate the industry benchmark investment in the original business, namely,

$$INVEST_{it}^{j} = \alpha + \beta_1 Q_{it}^{j} + \beta_2 CF_{it}^{j} + u_{it}^{j} \tag{1}$$

where $INVEST_{it}^{j}$ – the capital expenditure of firm i in industry j in PPE, intangible assets and other long-term assets in year t scaled by the relevant total assets[7] – measures firm investment, Q_{it}^{j} is Tobin'q which indicates firms' perspectives on future investment, CF_{it}^{j} is cash flow (net income before extraordinary items plus depreciation and amortization) scaled by the total assets, and u_{it}^{j} is the error term.

Following the literature, we regress specification (1) for each industry to obtain the relevant industry benchmark investment in original business. Then, for each firm in each period, we calculate its abnormal investment ratio, which is defined as the difference between the actual capital expenditure ratio and the capital expenditure ratio ($INVEST_{it}^{j}$) predicted by the model. If the abnormal investment ratio is negative, it suggests underinvestment in the original business by the concerned firm.

In the second approach, using propensity score matching method, we pair sample firms with investment property and those without investment property, and then do a comparison in their investment in the original business. Specifically, for each firm with investment property, we look among firms in the same industry as the concerned firm but without any investment property, and choose the one with the closest earnings growth as its matching pair. We then directly compare the difference in the ratio of capital expenditure scaled by the total assets ($INVEST_{it}^{j}$) between firms with investment property and their matched pairs.

To test how holdings of *investment property* affect firm performance, we analyze the stock market response both in the short run and in the long run. The advantage of using stock market data is that it is by nature forward looking and incorporates investors' perspective about firm future.

First, we take the event study approach to study how stock price responds to the disclosure of investment property by a firm. As explained earlier, we utilize the change in China's accounting standard effective first quarter of 2007, under which firms were required to disclose investment property for the first time and investors previously had little knowledge about their investment property, to deal with the potential endogeneity problem associated with the disclosure of information about investment property. Hence, we focus on the subsample of firms that were listed before the end of 2006. Specifically, we choose 2007Q1 report announcement date of each stock as the event date, and calculate the 3-day cumulative abnormal returns around the event date (CAR(-1,1)) for comparison

[6] There were some attritions from 2007 to 2013 due to mergers and acquisitions or delisting.

[7] Note that $INVEST_{it}^{j}$ does not include investment property, which was taken out of PPE according to the revised accounting standards issued by the Chinese Ministry of Finance since 2007.

between firms with and without investment property.

Next we examine how the extent of investment property holdings affects stock return in the long run. To do so, following the approach used in Tuzel (2010), we focus on those firms with investment property ownership and construct the ratio of investment property in physical assets (i.e., the sum of investment property and PPE) to measure the intensive margin of investment property ownership. For each financial year, we sort those firms with investment property into 5 portfolios according to their industry-adjusted investment property ratios (henceforth, IPRs), which are defined as the investment property ratios in excess of their industry averages: [(investment property)/(investment property +PPE)]$_{firm}$- [(investment property)/(investment property +PPE)]$_{industry}$. For each firm in a given portfolio, we calculate market excess return (firm return minus risk free rate) and industry-adjusted return (firm return minus industry average return). We then calculate both equal weighted (EW) average and market value-weighted (VW) average of the market excess return (or industry adjusted return) of each portfolio. We will examine if these excess returns correlate with IPRs.

To further explore the relationship between the extent of investment property holdings and stock returns. Following Tuzel (2010), We adjust the stock returns with market returns, size, value and momentum factors, with the following specification (FF4 model, hearafter):

$$r = alpha + \lambda_1 MKT + \lambda_2 SMB + \lambda_3 HML + \lambda_4 MOM$$

where r is the stock return minus risk free rate, MKT is market return minus risk free rate, SMB is the size factor, HML represents the value factor, and MOM (returns of portfolio that is long in short-term winners and short in short-term losers) is momentum factor.

We follow Fama and French (1993) and Xu and Zhang (2014) to construct size and value factors in Chinese stock market, and construct the momentum factor according to Jegadeesh and Titman (1993). Specifically, for each year, we sort our sample firms by two measures: one is whether its market value is above (denoted by B) or below (denoted by S) the median market value, and the other is whether its book-to-price (B/P) ratio is below 30 percentile of the whole sample (denoted by L), or above the 70 percentile (denoted by H) or in the middle (denoted by M). In other words, firms should belong to one of the following six portfolios: BH, BM, BL, SH, SM, and SL. We calculated the value-weighted[8] monthly returns of each portfolio. The size factor (SMB) is the simple average of the value-weighted monthly returns of the three large-firm portfolios (i.e., BH, BM, and BL) minus the simple average of the value-weighted monthly returns of the three small-firm portfolios. (i.e., SH, SM, SL). The value factor (HML) is the simple average of the returns of the two high-B/P portfolios (i.e., SH and BH) minus the simple average of the returns of the two low-B/P portfolios (i.e., SL and BL). The momentum factor (MOM) at time t is the portfolio return of previous cumulative return winners from $t-11$ to $t-1$ minus that of cumulative return losers from $t-11$ to $t-1$.

Alpha is the intercept representing the excess returns.[9] If the four factors introduced above can account for all the risks, alpha should be indistinguishable from zero. Other-

[8]In this paper, all the value-weighted returns are based on the market value of tradable shares.

[9]The four factors we construct explain 99% of the variations in our sample stock returns, though the alpha is not distinguishable from zero (results available upon requests). This might compromise the validation of the FF4 model for the Chinese stock market, presumably because Chinese stock market is different from U.S market in many aspects such as its split share structure.

wise, alpha represents some excess returns of the portfolio, which could be caused by some firm-specific attributes. In that case, we will sort the sample into portfolios according to investment property holdings to investigate if the excess returns are correlated with the extent of investment property.

3 Empirical results

3.1 Underinvestment in original business

Table 2 gives the summary statistics of key variables we use to forecast the industry benchmark investment in the original business.

Table 3 reports the results regarding whether firms with investment property underinvest in their original business (or hollowing out of the real economy), namely, whether the difference between the actual investment ratio (ratio of capital expenditure scaled by total assets) and the predicted ratio from specification (1) is negative or not.

In estimating the predicted ratio, we need to use Tobin's Q, which is defined as the ratio of market value of firms' assets to their replacement costs. For replacement costs, we try two measurements: one includes intangible assets and goodwill, and the other without, as intangible assets and goodwill are important yet difficult to evaluate. For market value of firms' assets, we also try two ways to value non-tradable shares, which is very common in Chinese listed firms: (1) aggressive approach – the price of non-tradable shares is the same as that of tradable ones; (2) conservative approach – the price of non-tradable is equal to the ratio of book equity (net assets) and contributed capital. Therefore, in combination, we have four different measurements of Tobin's Q.

Specifically, in Column (1) and Column (2), we use the conservative approach in estimating the market value of firms' assets, whereas in Column (3) and Column (4), we use the aggressive approach in estimating the market value of firms' assets. Meanwhile, in Column (1) and Column (3), we include intangible assets and goodwill in the replacement costs, whereas in Column (2) and Column (4) we exclude intangible assets and goodwill in the replacement costs.

Panel A of Table 3 shows the findings obtained using annual data. Clearly, the four different measurements of Tobin's Q produce similar results regarding whether firms with investment property underinvest in their original business. Take Column (1) as an example, we find that firms with investment property annually underinvest by 0.007, which is about 10% of the mean of annual investment ratio (0.065).

We also obtain similar results when using semi-annual data for the estimation (i.e., Panel B of Table 3), and find that firms with investment property semi-annually underinvest by around 0.004, also 10%, relative to the mean of semi-annual investment ratio (0.039).

In Column (5), we directly compare the difference in the mean of investment ratio between firms with investment property and their matched pairs. Similarly to our findings in Columns (1)-(4), Column (5) of Panel A shows that firms with investment property annually underinvest than their matched pairs without investment property but the magnitude of the difference – 0.0099 (or 16.1% of the matched sample mean) – is much bigger. We find similar results when using semi-annual data for analysis. Column (5) of Panel B shows that firms with investment property semi-annually underinvest 0.0083 (17.89% of the matched sample mean). This can be explained as that the industry-benchmark investment ratio used in obtaining results of Columns (1) - (4) is itself an average of the

investment ratio of firms with investment property and that without investment property, as a result of which the true degree of under-investment by firms with investment property is under-estimated. In summary, there is strong evidence that firms with investment property under-invest in their original business. In other words, the concern of hollowing out of the real economy is supported by the firm-level data.

3.2 Stock market response

Table 4 reports the results of an event study on the stock market response to the first-time disclosure of investment property.

In the Panel A, we use all firms without any investment property as the comparison group for firms with investment property. Row (1) reports number of firms with investment property, the mean of their cumulative abnormal returns around event day CAR(-1,1), and the standard deviation of CAR(-1,1). Row (2) gives the corresponding information for the comparison group. In row (3), we report the difference in the mean of their cumulative abnormal returns between firms with investment property and those without. It is found that firms with investment property enjoy higher short-term return during the event, albeit statistically insignificant.

Panel B shows the results of matched sample analysis.[10] Similar to what we find in Panel A, firms with investment property enjoyed higher short-term return than their matched pairs during the event, albeit statistically insignificant.

Table 5 reports the descriptive statistics of five portfolios of firms with investment property sorted by industry-adjusted investment property ratio (IPR). We can observe significant dispersion in IPR across the portfolios (see row (1) of Table 5). For the firms in the lowest quintile, the average industry-adjusted IPR is -5.9% (meaning that their IPRs are lower than the industry averages by 5.9%), whereas for the firms in the highest quintile, the average industry-adjusted IPR is 36.2% (meaning that their IPRs are higher than the industry averages by 36.2%). For each firm in a given portfolio, we calculate market excess return (firm return minus risk free rate) and industry-adjusted return (firm return minus industry average return). We then calculate both equal weighted (EW) average and market value-weighted (VW) average of the market excess return (or industry adjusted return) of each portfolio.

Panel A of Table 5 reports the results of market excess returns, while Panel B reports the results of industry adjusted returns. As shown in Panel A of Table 5, the market excess return generally increases from the lowest quintile to the highest quintile. Firms in the highest quintile exhibit 1.9% higher (value weighted) monthly market excess return than firms in the lowest quintile. The same pattern is observed for industry adjusted returns shown in Panel B. There is a generally positive correlation between the industry adjusted IPRs and industry adjusted returns across the five portfolios. Firms in the lowest quintile experience 0.15% higher monthly return than the industry averages, whereas firms in the highest quintile have 1.8% higher monthly return than the industry averages.

To further explore the relationship between the extent of investment property holdings (IPRs) and the returns of IPR-sorted portfolios, we adjust the returns with market returns, size, value and momentum factors to filter out the impacts of these factors. Table 6 shows the excess returns (alphas) in each portfolio after adjusting for market return,

[10] The number of observations drops as some of the firms with investment property could not be matched with firms without any investment property.

size, book-to-market and momentum factor. We observe that alpha is statistically significantly different from zero in each of the five portfolios. However, we do not observe any monotonic relation of the excess return in the extent of investment property holdings. We also test if the difference between the excess return of the highest quintile and that of the lowest quintile is zero or not. As shown in the last column of Table 6, the difference is not statistically different from zero (with a p-value of 0.12).

We further explore the cross-sectional variation in the relationship between investment property and long term stock returns in two dimensions.

First, we conjecture that state-owned firms may behave very differently from non-state-owned firms in diversifying into investment property. On one hand, due to their closer ties to the government, state-owned firms may gain easier access to sites of investment properties and/or enjoy lower cost financing for developing or purchasing properties when compared with their non-state-owned counterparts. On the other hand, anecdotal evidence suggests that state-owned enterprises may have serious agency problems, often overbidding in land auctions (Deng et al., 2011) and having inefficient real estate development and management. We therefore divide firms into state-owned and non state-owned firms, and run the FF4 model separately for each group. As reported in the Panel A and Panel B of Table 7, for state-owned firms, there is more evidence for the positive correlation between investment property holdings and excess returns.

Second, we also conjecture that firms in different geographic locations may behave differently in their diversification into investment property. Specifically, in regions with heavy government interventions, firms with strong government ties may gain easier access to sites of investment properties and/or enjoy lower cost financing for developing or purchasing properties. Meanwhile, these firms could also be subject to severe government expropriations, especially as real estate investment is location specific. Therefore, we divide the firms into two groups according to the Fan Gang index of market liberalization of the province where they are incorporated.[11] As reported in Panel C and D of Table 7, there is more evidence for the positive correlation between investment property holdings and excess returns for firms located in regions with lower level of market liberalization, albeit statistically marginally significant (with a p-value of 0.069).

In our FF4 model analysis above, we classify firms into 18 industries according to the first letter of their industry codes by CSRC (Table 6). For robustness check, we also use the more disaggregated classification and divide sample into 90 sectors. As shown in Panel E of Table 7, the results are qualitatively the same.

In the above analysis on the relation between investment property holdings and excess market returns (Table 6), we restrict our sample to firms with positive investment property holdings. In the robustness test, we directly compare the stock performance between firms with and without investment properties. Specifically, we apply FF4 model to the two samples, and then compare the alphas. As shown Table 8, there is no difference in excess returns between firms with investment property and those without investment property, reinforcing our earlier results on the insensitivity of stock returns to investment property holdings.

Overall, we find both the short-run and long-run stock market responses to investment property holdings to be lukewarm, indicating that investors are not keen about diversification of non-real estate firms into real estate and worried about the competitiveness of those firms in the future.

[11] We assume that firms are more likely to invest properties in the place where they are incorporated.

4 Conclusion

The rise of the East Asian economies typically starts with the development of their manufacturing industries, with the advantage of low labor cost and favorable government policies. Along with the rapid growth and development of those economies, we observe rapid rises in asset prices, especially real estate asset prices, and then, quite puzzlingly, diversification of manufacturing firms into real estate development. China is the latest example, with some of its most prominent manufacturing firms engaging in commercial real estate business. It is both interesting and important to understand the impacts of such diversification on firm investment strategy and stock market response.

In this study, we take advantage of a sudden change in China's accounting standards that requires firms to disclose information about their real estate holdings for investment purpose (or investment property), and examine both the impact of diversification into investment property on firms' investment in their original business and the stock market response to such diversification. Interestingly, we find a decrease in investment in the original business along with the diversification into investment property, albeit not a causal relation, confirming the conjecture that there is a hollowing out of the real economy in China. Furthermore, we find that there is a lack of investor response, both short run and long run, to the diversification into investment property, indicating that investors do not give premiums to investment property and, on the contrary, they might be worried about the risks associated with the decrease in the investment in the original business.

Our study suggests that the behavior of non-real estate firms diversifying into investment property could be an irrational one. This begs the question of why such behavior takes place and what government can do to prevent the hollowing out of the real economy. Given that there are few existing studies on developing economies and guiding us to think about these questions, we believe there is a need for more rigorous study on the causes of manufacturing firms diversifying into real estate and its impacts on the long-run competitiveness of developing economies.

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Table 1: Extent of diversification into Investment Property (IP) across years

The descriptive statistics of this table is based on those firms which were listed before 2007

Year	Total number of firms	Firms with IP	Proportion in the sample	Average IP/Total Assets
2007	1,345	533	39.63%	0.0441
2008	1,335	567	42.47%	0.0435
2009	1,334	585	43.85%	0.0431
2010	1,325	601	45.36%	0.0390
2011	1,323	629	47.54%	0.0363
2012	1,319	646	48.98%	0.0348
2013	1,316	670	50.91%	0.0321

Table 2: Summary Statistics

Table 2 gives summary statistics of key variables. Invest is annual capital expenditure in PPE, intangible assets and other long-term assets scaled by total asset. CF is the cash flow (net income before extraordinary items plus depreciation and amortization) scaled by the total assets. Growth is the annual earnings growth. TobinQ1-4 are four different measurements of Tobin Q[1]. IP is the investment property scaled by total asset.

Variable	obs	Mean	Std.Dev.	Min	Max
Invest	11,404	0.06	0.06	0	0.55
CF	11,404	0.06	0.21	-18.89	0.81
Growth	11,404	0.15	0.31	-1.00	2.00
TobinQ1	11,404	2.17	5.41	0.62	393.01
TobinQ2	11,404	2.33	5.52	0.64	393.01
TobinQ3	11,404	2.70	6.31	0.60	393.01
TobinQ4	11,404	2.90	6.44	0.62	393.01
IP	11,404	0.13	0.04	0	0.91

[1] **Tobinq1**: market value1/total asset; **Tobinq2**:market value1/(total asset-intangible asset-good will); **Tobinq3**:market value2/total asset; **Tobinq4**:market vaule2/(total asset-intangible asset-good will)
Market value1= (tradable A shares*closing price+ foreign shares*closing price*spot exchange rate)+(total shares –tradable shares-foreign shares)*equity/contributed capital+debt; *Market vaule2*=(total shares-foreign shares)*closing price+foreign shares*closing price*spot exchange rate+debt

Table 3: Underinvestment in original business

The table provides evidence of underinvestment in original business of firms with investment property. The sample includes all listed firms of industries other than real estate and construction that were traded for at least two years in China A-share stock market over the period of 2007-2013. We divide firms into 18 industries according to CSRC Industry classifications, and regress investment level (measured as the capital expenditure scaled by total assets) on Tobin's Q and cash flow level for the benchmark investment model for each industry over the period. Then, for each firm in each period, we calculate its abnormal investment ratio, which is defined as the actual ratio of capital expenditure scaled by the total assets minus the ratio of capital expenditure scaled by the total assets predicted by the model. Column (1) to Column (4) represent the means of abnormal investment for sample firms with investment property corresponding to four measurements of Tobin's Q, t-statistics and number of the observations. Column (5) presents the difference between the mean investment ratio by sample firms with investment property and that by those without investment property, after matching the paired firms in the same industry with the closest earning growth in the same period.

Panel (A) and Panel (B) report the result of annual data and semi-annual data respectively.

* Significant at 0.1, ** Significant at 0.05; ***Significant at 0.01 (two sided test).

Panel A: Annual data

	Abnormal Investment Ratio (in percentage)				Difference of mean investment ratio between matched pair
	(1)	(2)	(3)	(4)	(5)
	Tobinq1	Tobinq2	Tobinq3	Tobinq4	
Diff	-0.70***	-0.70***	-0. 71***	-0.71***	-0. 10***
t-statistics	(8.979)	(8.909)	(9.081)	(9.032)	(7.691)
Observations	4,381	4,381	4,381	4,381	4,062

Panel B: Semi-annual data

	Abnormal Investment Ratio (in percentage)				Difference of mean investment ratio between matched pair
	(1)	(2)	(3)	(4)	(5)
	Tobinq1	Tobinq2	Tobinq3	Tobinq4	
Diff	-0. 50***	-0.46***	-0.46***	-0.45***	- 0 .84 ***
Statistics	(15.891)	(15.745)	(16.071)	(15.904)	(12.751)
Observations	8,766	8,766	8,766	8,766	7,849

Table 4: Market response after disclosure of Investment Property

Table 4 reports the results of an event study on the stock market response to the first-time disclosure of investment property. Row (1) reports number of firms with investment property, the mean of their cumulative abnormal returns (in percentage) around event day CAR(-1,1), and the standard deviation of CAR(-1,1). Row (2) gives the corresponding information for the comparison group. In row (3), we report the difference in the mean of their cumulative abnormal returns between firms with investment property and those without. In the Panel B, for each firm with investment property, we look among firms in the same industry but without any investment property, and use the propensity score matching method to choose the one with the closest earnings growth as its matching pair for comparison. T-statistics of the difference are shown in the parentheses.

		Panel A: Full sample			**Panel B: Matched-Sample**		
		(1)	(2)	(3)	(4)	(5)	(6)
		N	CAR (-1,1)	Std.Dev.	N	CAR (-1,1)	Std.Dev.
(1)	With Investment Property	347	1.51	12.68	331	1.47	24.3
(2)	Without Investment Property	861	0.82	23.7	331	-1.68	6.83
(3)	Difference		0.69			1.64	
			(-0.329)			(-1.446)	

Table 5: Descriptive statistics of IPR (Industry adjusted) -sorted portfolios

Table 5 presents the monthly market excess returns and industry adjusted returns for IPR (industry-adjusted)-sorted portfolios. IPR is defined as (Investment Property)/(Investment Property+PPE). Industry adjusted IPR is calculated as $[(\text{Investment Property})/(\text{Investment Property+PPE})]_{firm}$- $[(\text{Investment Property})/(\text{Investment Property+PPE})]_{industry}$, for 18 industry categories defined by CSRC (China Securities Regulatory Commission). In this table, sample firms are grouped into five portfolios based on industry adjusted IPR. N is the total number of observations. r_{VW} of Panel A (or Panel B) is the average monthly market excess (or industry-adjusted) returns of each portfolio weighted on market value of tradable shares, while r_{EW} of Panel A (or Panel B) is the equal-weighted average of monthly market excess (or industry-adjusted) returns of each portfolio. δ_{VW} and δ_{EW} are the standard deviations of the value-weighted and equal-weighted returns respectively.

		(1)	(2)	(3)	(4)	(5)
	IPR Quintile	low	2	3	4	high
(1)	Industry adjusted IPR	-5.87	-2.04	0.11	6.31	36.25
(2)	N	8,912	8,962	9,022	8,955	8,912
		Panel A: Average market excess returns (%)				
(3)	r_{VW}	1.02	1.49	1.41	2.10	2.98
(4)	δ_{VW}	12.06	12.16	11.71	12.88	16.54
(5)	r_{EW}	1.01	1.31	1.36	1.63	1.93
(6)	δ_{EW}	12.70	9.46	12.95	13.67	13.92
		Panel B: Average industry-adjusted returns (%)				
(7)	r_{VW}	0.16	0.77	0.65	1.05	1.85
(8)	δ_{VW}	8.98	9.46	9.09	10.23	14.04
(9)	r_{EW}	0.24	0.75	0.97	0.67	1.16
(10)	δ_{EW}	9.41	9.79	9.60	10.29	10.64

Table 6: FF4 model analysis of portfolios sorted on industry-adjusted IPR.

Table 6 shows the excess returns (alphas) in each IPR-sorted portfolio after adjusting for market return, size, book-to-market, and momentum factor. Firms with investment property are sorted into 5 portfolios according to their industry-adjusted investment property ratios. In each portfolio, firms' industry adjusted returns are aggregated according to market value and then the portfolio returns are adjusted with four factors to obtain the excess firm returns (alpha). Column (1) to column (5) shows the results of each portfolio. Column (6) shows the return difference between the highest portfolio and the lowest portfolio. t-statistics are shown in the parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
IPR-Quintile	low	2	3	4	high	high-low
Value-weighted portfolios						
Dependent Variable: Industry excess returns (%) July 2007-July 2014						
Alpha	0.55	1.03	0.48	1.19	1.23	0.68
	(2.45)	(4.76)	(1.92)	(5.11)	(3.42)	(1.57)
MKT	6.10	4.14	-3.35	6.51	2.70	-3.40
	(2.25)	(1.58)	(-1.11)	(2.31)	(0.62)	(-0.65)
SMB	-22.05	-8.60	12.89	-4.40	23.46	45.51
	(-3.48)	(-1.41)	(1.83)	(-0.67)	(2.30)	(3.70)
HML	-7.61	-19.83	0.32	-15.03	-15.55	7.94
	(-0.71)	(-1.92)	(0.03)	(-1.35)	(-0.90)	(-0.38)
MOM	-4.55	-6.30	-1.79	-3.39	-0.93	3.62
	(-0.98)	(-1.41)	(-0.35)	(-0.70)	(-0.12)	(0.4)

Table 7: FF4 model analysis of various subsamples

The table presents the alphas (in percentage) of four-factor regression results in different robustness checks. Panel A and Panel B show the results of stated-owned firms (Panel A) and non state-owned firms (Panel B) respectively. Panel C and Panel D show the results of two groups of people: firms incorporated in provinces with high Fan Gang Index (Panel C) and those incorporated in provinces in low Fan Gang Index (Panel D). Panel E presents the result with the same mythology as in Table 6 but with finer industry classification (two-digit CSRC industry code). Results are based on market value-weighted industry excess returns of five IPR (Industry-adjusted)-sorted portfolios with four-factor (market, size, value and momentum) model. Alpha is the excess returns for each portfolio. Column (6) is the return difference between highest IPR portfolio with the lowest. t-statistics are shown in the parentheses.

(1)	(2)	(3)	(4)	(5)	(6)
low	2	3	4	high	high-low
Panel A:SOE Firms					
0.37	0.26	0.65	0.774	1.04	0.67
(2.18)	(1.56)	(3.98)	(4.16)	(2.11)	(1.19)
Panel B:Non-SOE Firms					
0.86	1.03	0.81	0.13	0.86	0.002
(3.77)	(4.00)	(2.25)	(0.39)	(3.4)	(0.01)
Panel C:High Fan Gang index					
0.78	0.77	0.63	0.95	1.14	0.36
(2.91)	(3.03)	(2.62)	(3.48)	(2.52)	(0.65)
Panel D:Low Fan Gang Index					
0.30	1.03	0.15	0.11	1.26	0.10
(0.96)	(2.59)	(0.3)	(0.29)	(3.18)	(1.84)
Panel E:CSRC 2-digit Industry Classification					
0.38	0.23	0.24	0.32	0.65	0.27
(1.53)	(1.39)	(0.97)	(1.57)	(1.82)	(0.8)

Table 8: FF4 model analysis of firms with investment property and those without investment property (IP)

The table presents the regression results of market value-weighted industry excess returns of two portfolios: firms with investment property and firms without. Alpha (in percentage) is the excess returns for each portfolio. The last column is the return difference between highest IPR portfolio with the lowest. t-statistics are shown in the parentheses.

	(1)	(2)	(3)
	With IP	Without IP	Difference
Intercept	1.011	0.85	-0.036
	(11.83)	(7.32)	(-0.21)
MKT	-1.074	2.929	4.317
	(-1.21)	(2.08)	(2.05)
SMB	-0.636	1.96	0.954
	(-0.34)	(0.59)	(0.19)
HML	9.673	-15.258	-25.968
	(2.68)	(-2.74)	(-3.12)
MOM	0.405	-2.651	-2.567
	(0.24)	(-1.1)	(-0.71)