

A Study on the Effects of the Purchase Restriction Policy on the Financial Leverage and Risk of Real Estate Enterprises

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Abstract: This study utilizes data from China's listed real estate enterprises between 2009-2019 and employs the continuous DID model to regress the two rounds of purchase restriction policies. The empirical results reveal that the first round of restriction policy (2010-2014) significantly improved the leverage ratio, while the second round (2016-2019) had an inhibitory effect on the leverage ratio. The impact on the leverage ratio was transmitted through the housing price. In the first round, the policy did not work, and the house prices and leverage ratio continued to rise. In contrast, the second round had a negative impact on the house price, and the increase of the leverage ratio was restrained through this transmission channel. Additionally, the study found that the first round had no impact on short-term and long-term solvency, while the second round improved short-term solvency but weakened long-term solvency. These findings provide a new perspective for preventing financial risk in the real estate industry in the future.

Keywords: Purchase Restriction, Corporate Leverage, Financial Risk, Real Estate

1. Introduction

After the 2008 international financial crisis, the Chinese government implemented measures to expand domestic demand, preventing the economy from falling into a severe recession but causing an increase in the leverage ratio. To address this, deleveraging has become a crucial aspect of the supply-side structural reform. The real estate industry in China has been accumulating debt at an alarming rate since 2006, resulting in it having the highest leverage ratio as of 2021. This high leverage has affected the solvency of enterprises, and if it continues to rise, a debt crisis may occur. Therefore, the real estate industry requires urgent deleveraging.

To tackle this issue, the government has introduced several real estate regulation policies in recent years, with the purchase restriction policy being one of the most significant. This policy was implemented in 2010 and was the toughest regulation policy at that time, requiring all levels of government to limit the number of houses a family could purchase within a certain period. By the end of 2011, a total of 46 cities across the country had implemented purchase restriction. The housing market gradually cooled down, and the cities with purchase restrictions phased out the policy in 2014. However, in the first half of 2016, the real estate market was stimulated by multiple favorable policies, leading to a sharp rise in the market. In response, the government initiated a new round of comprehensive real estate regulation. 40 cities across the country have implemented purchase restriction one after another.

The impact of purchase restriction policies on real estate companies has been analyzed in the existing literature, particularly concerning firm risk-taking and business operations. Liang Ruobing et al. explored the influence of the same two types of purchase restriction policies on listed real estate entities' value and found that both these policies significantly decreased their market worth, especially when businesses' sales in restricted cities constituted a larger share [1]. Meanwhile, Zheng Shilin et al. discerned that purchase restrictions had an adverse effect on listed companies' default risk. This is due to the fact that these restrictions restrict the escalation of housing prices and real estate investment, leading to altered operating capabilities of related companies, consequently affecting their likelihood of default [2].

However, the existing research literature has not directly discussed the specific impact of purchase restriction policy on the leverage of real estate enterprises. Therefore, this paper examines the impact of purchase restriction policy on the leverage of real estate enterprises, while this paper further focuses on the impact of restriction policies on debt risk. High leverage does not necessarily imply high debt risk.

Although the purchase restriction policy can make real estate enterprises adjust their business strategies and reduce their leverage, the suppression of popular demand will cause a backlog of housing inventory, increase the risk of capital flow breakage of real estate enterprises, and lead to debt crisis of real estate enterprises.

The innovations of this paper are mainly in the following areas:

(1) Most of the existing literature studies the impact of purchase restriction on urban housing prices, and little literature studies the impact of purchase restriction policy on corporate leverage and the mechanism of action. This paper adds a little to the existing research by studying the impact of the purchase restriction policy on the leverage of real estate enterprises, starting from the supply side of housing.

(2) In previous literature, the DID model was commonly used to compare the differences before and after policy implementation between cities with and without purchase restrictions. However, a real estate company may have conducted property development in each city, making it difficult for traditional DID models to accurately identify the impact of purchase restrictions on real estate enterprises. This article considers the differences in policy impact that each real estate enterprise faces in restricted cities and has constructed a refined intensity variable for purchase restrictions based on Liang Ruobing's (2021) approach, which better analyzes the differentiated impact of these policies on real estate enterprises.

(3) Most of the existing literature studies only the first round of purchase restriction policy, and few studies have combined both rounds for analysis. In this paper, we conduct research on the two rounds of purchase restriction policies, with a focus on analyzing the differences in their impacts. The results find that the first round of purchase restriction policy (2010-2014) instead significantly increases the leverage ratios of real estate enterprises, while the second round of purchase restriction (2016-2019) has a suppressive effect on these ratios.

2. Theoretical Mechanism

The purchase restriction policy limits the eligibility of residents to purchase houses and the number of house sets, thereby suppressing the rise of house prices and reducing the sales of houses in cities with purchase restrictions. Most cities with purchase restrictions are first and second-tier cities with a more developed economy, and since most real estate enterprises have an industrial layout in these cities, they are significantly impacted by the purchase restriction policy.

In terms of profitability, the policy has suppressed both consumer demand for housing and the rise in housing prices, resulting in a significant decline in the sales revenue of real estate enterprises. The largest investment cost for real estate companies is land auction costs. After the implementation of the purchase restriction policy, there are new regulations on land auctions that require real estate companies to pay the full amount of land transfer fees within one year after acquiring the land and the down payment ratio cannot be lower than 50% of the total price. This has led to a sustained increase in land auction costs for real estate companies, resulting in reduced profits and affecting their profitability and leverage ratios.

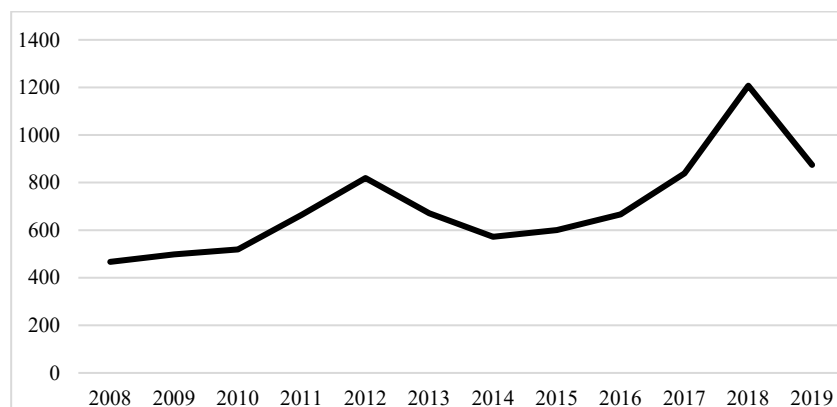


Figure 1: Land transfer income of real estate enterprises in China, 2008-2019

In terms of business strategy, on the one hand, their capital recovery cycle becomes longer, leading to capital tension problems. To protect the flow of funds, real estate companies may carry out credit expansion, leading to an increase in leverage. On the other hand, due to the purchase restriction policy,

real estate companies will adjust their expectations and business strategies in the case of a housing market downturn. The adjustment is mainly reflected in reducing debt and improving cash flow. They will delay external expansion, intentionally reducing the scale of corporate credit. Besides, cash flow is recovered through land transfer and auction. As shown in Figure 1, when the policy is implemented, the land transfer income will rise sharply, and when the policy is lifted, the land transfer income will fall back to normal fluctuation. Through land re-auction and sale, real estate companies can curb the rise of corporate leverage.

Furthermore, the comparative study found that the effects of the two rounds of purchase restriction policies differ. First, the economic environment is different, and the second round of purchase restrictions was implemented during economic growth deviations, resulting in lower resident demand for housing than during the first round. Second, the first round was a unified central directive, with localities only responsible for implementation. In contrast, the second round was mainly by localities to develop their policies for the local real estate market environment, which were more precise and localized. Additionally, the second round means more diverse, including targeted loan restrictions and price restrictions, with an intensity of regulation. Third, real estate enterprises changed their strategies after the first round of purchase restriction policy. For the restart of policy, real estate enterprises were more targeted and anticipatory in their response, adjusting to a more appropriate business model to deal with this. The above reasons may lead to the difference between the effects of the two rounds. The second round may be implemented better than the first round, indirectly leading to a different impact on the leverage ratio.

3. Model and Data

3.1 Continuous DID Model

In this paper, the introduction of the purchase restriction policy is considered as a difference-in-differences (DID). However, since the research subjects are listed real estate enterprises with businesses in both purchase restriction and non-purchase restriction cities, not all businesses will be affected equally. To accurately identify the real estate enterprises affected by the purchase restriction policy, this paper adopts the continuous difference-in-differences model, as recommended by Ruo-Bing Liang [1]. Compared to the standard DID model, the continuous DID model uses continuous variables to distinguish the experimental group from the control group, instead of explicitly setting a control group. In this paper, the policy directly affects the property sales amount in the relevant cities. The intensity of purchase restriction is measured by an intensity index. The greater the percentage of sales in cities with purchase restrictions, the stronger the impact on real estate companies.

The baseline regression equation is defined as follows:

$$lev_{it} = \alpha_0 + \alpha_1 pr_{it} + \alpha_2 loan_{it} + \beta X_{it} + \lambda_1 + \varepsilon_{it} \quad (1)$$

Where pr_{it} represents the intensity of purchase restriction policy, $loan_{it}$ represents the intensity of real estate credit policy, measured by the growth rate of real estate development loans, and X is the control variable. The Explained Variable is the leverage ratio, which is measured by the total liabilities/total assets of enterprises.

3.2 Variable Description

The intensity of the purchase restriction policy is calculated as follows:

$$pr_{it} = \sum_{j=1}^{46} \left(\frac{sale_{ij}}{sale_i} \right) \times PO_{jt} \quad (2)$$

Considering that the purchase restriction policy is implemented in several cities, this paper selects the business share of enterprises in cities with purchase restriction as the intensity indicator to measure the degree of enterprises affected by purchase restriction. PO_{jt} measures whether city j is subject to purchase restriction at moment t , where the value is taken as 0 when the city does not implement purchase restriction and becomes 1 when the city starts to adopt purchase restriction policy. The variable $sale_{ij}$ is the sales of enterprise i in city j in year t , and $sale_i$ is the total sales of enterprise i in China in year t . We compute the sum of the product of this sales ratio and PO_{jt} across all cities with purchase restrictions to obtain a measure of the proportion of firm i 's sales that are affected by these restrictions. This measure accounts for differences in the timing of purchase restrictions across cities and differences in the distribution of

firm i's projects across cities.

Regarding control variables, this paper selects firm size (natural logarithm of total firm assets), growth (Tobin's q-value), profitability (return on assets), non-debt tax shield, and tangible asset share at the firm level. The financial data of this paper were obtained from CSMAR database, macroeconomic data from National Bureau of Statistics, and enterprise city sales data from CRIC database and CREIS database. This paper uses data of 98 A-share listed companies from 2009-2014 and 2015-2019 for regression analysis, after applying a 99% tailing process to remove the effect of extreme values.

4. Regression analysis

4.1 principle regression

this paper uses a panel regression model with fixed effects for the two rounds of purchase restriction policy and finds that:

Table 1: Principal regression analysis

	The first round	The second round
	lev	lev
pr1	0.0181**	
	(0.0166)	
pr2		-0.0213**
		(0.0238)
hpr	0.0426**	0.0021
	(0.0231)	(0.9505)
txi	0.7748***	0.0563
	(0.0000)	(0.9349)
fata	-0.5730***	-0.1750
	(0.0000)	(0.4411)
lnas	0.1082***	0.1018***
	(0.0000)	(0.0000)
q	0.0058	0.0070
	(0.6023)	(0.4432)
roa	-0.5967***	-0.6994***
	(0.0000)	(0.0000)
_cons	-1.8344***	-1.7433***
	(0.0000)	(0.0000)
N	567	475
R ²	0.530	0.340

p-values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

The results, presented in Table 1, show that the implementation of the first round significantly increases the leverage of real estate enterprises, with a positive coefficient of 0.0181 at the 5% level. In addition, the tightening of lending restriction also raises the leverage ratio. On the other hand, the second round has a dampening effect on the leverage ratio, with a negative coefficient of -0.0213 at the 5% level. This indicates that the second round has a suppressive effect on the leverage ratio. However, the intensity of lending restriction in the second round is insignificant, suggesting that the lending restriction policy does not affect the leverage of real estate enterprises. This may be due to the low growth rate of real estate development loans, which has a small impact that cannot be measured.

4.2 Robustness tests

To ensure the robustness of the empirical results, this paper conducts a robustness test by replacing the core explanatory variable of the intensity of purchase restriction with the proportion of sales area and number of units sold in the cities with purchase restriction.

Table 2: Robustness tests

	(1)	(2)	(3)	(4)
	lev	lev	lev	lev
pm1	0.0364*** (0.0000)			
pm2		-0.0181* (0.0655)		
pa1			0.0361*** (0.0000)	
pa2				-0.0163* (0.0954)
control variables	YES	YES	YES	YES
N	567	475	567	475
R ²	0.543	0.337	0.543	0.336

p-values in parentheses *p < 0.10, **p < 0.05, ***p < 0.001

The results, presented in Table 2, show that the signs of the regression coefficients remain the same as in the benchmark model, indicating that the impact of purchase restriction on the leverage of real estate firms is robust. Specifically, the first round significantly increases the leverage ratio while the second round has a suppressive effect on the leverage ratio.

4.3 Analysis of the reasons for different policy effects

This paper argues that the impact of purchase restrictions on the leverage of real estate firms is transmitted through their effect on house prices and sales. Successful implementation of the purchase restriction policy can force real estate firms to control their own leverage and risk by adjusting their business strategies, delaying capital investment, and reducing their own demand for capital. However, the effect of the policy on leverage is uncertain, and only a successfully implemented policy can affect the leverage ratio of real estate enterprises.

To further investigate the impact of purchase restrictions on house prices and sales, this paper constructs a DID model, using the 70-city real estate price index and monthly sales of commercial residential properties as explained variables and controlling for population, monetary policy, inflation, and economic development level [3]. The explanatory variables are dummy variables for whether the city has implemented the restriction policy in the current period, and the model is set as follows:

$$Y_{it} = \alpha_0 + \alpha_1 D_{it} + \beta X_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (3)$$

D is a monthly dummy variable, if the city is in purchase restriction time, D takes 1, otherwise it takes 0. Y is the real estate price index or residential monthly sales, this data from NBS and CREIS database. X represents the control variables.

Table 3: Test of influence mechanism

	The first round		The second round	
	index	sales	index	sales
D	0.5156*** (0.0000)	1.7414 (0.1239)	-1.2307*** (0.0000)	-23.5586*** (0.0000)
control variables	YES	YES	YES	YES
N	4140	2904	3300	3063
R ²	0.104	0.105	0.138	0.060

*p-values in parentheses *p < 0.10, **p < 0.05, ***p < 0.001

Table 3 presents the results indicating that while the first round did not halt the rise in housing prices, it did not significantly impact overall sales, thus minimizing the impact on real estate companies' operating capacity. In the context of rising housing prices, real estate companies would expand outwardly, leading to increased leverage. Conversely, the second round, implemented in a comparatively weaker economic growth environment with less mass demand for housing, was more precise and localized, resulting in more stringent regulation and control, curbing the surge in housing prices which contributed toward a significant decrease in housing sales. As a result, during this weakening period of the real estate market, these firms intentionally lowered their investments, reducing their need for funds, and in turn, restraining the increase in leverage. The dissimilar effects of the two rounds observed in local markets

can be attributed to variant macroeconomic conditions and diverse policies introduced at a regional level.

5. Impact of purchase restriction policy on debt risk of real estate enterprises

This article examines the relationship between purchase restriction policies and debt risk in Chinese real estate enterprises. Despite high leverage ratios, China's real estate industry heavily relies on credit financing given its significant development funds, long repayment cycles, and high proportion of non-self-raised funds [4]. This has created the issue of high leverage ratios in such firms that are hard to reduce in the short term. However, it is important to emphasize that high leverage ratios do not necessarily lead to debt crises. Therefore, identifying the dominant and immediate risks of debt is crucial in preventing financial crises. With this in mind, this paper analyzes the impact of purchase restrictions on debt risk in Chinese real estate companies by constructing a regression model presented as follows:

$$Y_{it} = \alpha_0 + \alpha_1 pr_{it} + \alpha_2 loan_{it} + \beta X_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (4)$$

In this paper, we adopt financial ratios such as short-term solvency ratios and long-term solvency ratios as well as Altman's Z-score model to measure the magnitude of debt risk in real estate enterprises. Stronger solvency ratios lower the probability of facing debt crises. Short-term solvency ratios, including current ratio, quick ratio, and cash ratio, reflect a company's ability to meet its short-term obligations, improving as these ratios increase. The long-term solvency is measured by equity ratio, which decreases as the company can meet its long-term obligations. Additionally, we use Altman's Z-score model to measure the debt risk of a company, where $Z\text{-score} = 1.2 \times \text{working capital}/\text{total asset} + 1.4 \times \text{retained earnings}/\text{total asset} + 3.3 \times \text{earnings before interest and tax}/\text{total asset} + 0.6 \times \text{equity}/\text{total liability} + 0.999 \times \text{sales}/\text{total asset}$, where a lower value of Z-score indicates higher debt risk. The explanatory variables remained consistent with the basic regression equation [5].

Table 4: Purchase restriction policy and short-term solvency

	(1)	(2)	(3)	(4)	(5)	(6)
	current ratio		quick ratio		cash ratio	
The first round	-0.1093 (0.6382)		-0.0576 (0.8035)		-0.0398 (0.8085)	
The second round		0.1469 (0.1793)		0.1617** (0.0466)		0.0772 (0.1202)
control variables	YES	YES	YES	YES	YES	YES
N	567	475	567	475	567	475
R ²	0.268	0.076	0.285	0.068	0.309	0.055

Table 5: Purchase restriction policy and long-term solvency

	(7)	(8)	(9)	(10)
	equity ratio		Z-score	
The first round	-0.0380 (0.7857)		-0.5782 (0.6870)	
The second round		0.9435** (0.0072)		-0.4494*** (0.0005)
control variables	YES	YES	YES	YES
N	582	489	582	489
R ²	0.012	0.328	0.007	0.050

*p-values in parentheses *p < 0.10, **p < 0.05, ***p < 0.001

Table 4 shows the regression results. With regard to short-term solvency, the first round of purchase restriction policy showed no significant impact on short-term solvency. However, the second round of the restriction policy had a positive impact on short-term solvency. Table 5 illustrates that the first round did not affect long-term solvency, but the second round weakened it, increasing the debt risk. The comparison of the two rounds of purchase restriction policy shows that the first round was ineffective since it had no significant impact on the leverage and debt risk of real estate enterprises. In contrast, the second round had a negative effect on housing sales and the rise of leverage of real estate enterprises, which was suppressed, and the short-term solvency was enhanced. However, the long-term solvency of real estate enterprises did not improve, and the debt risk did not decrease. The second round only briefly reduced the leverage ratio of real estate enterprises, and the continued downturn of the real estate market

in the long run will lead to the accumulation of inventories of real estate enterprises and increase the risk of capital flow breakage of real estate enterprises. Therefore, the second round increased the debt risk of real estate enterprises.

6. Conclusions and Recommendations

6.1 Conclusions

This study examines the impact of real estate purchase restriction policies on the leverage and debt risk of real estate firms. The primary objective of these policies is to limit residents' demand for housing and curb housing prices. The government introduced two rounds of purchase restriction policies between 2011 and 2019, which differed significantly. The first round began in 2010, and the government gradually relaxed it in 2014. In 2016, the government reinstated the purchase restriction policy, which was not relaxed again until the beginning of 2023. This study analyzes two separate window periods, 2009-2014 and 2015-2019.

The study's findings are as follows:

(1) The first round of purchase restriction policy had a positive impact on the leverage of real estate enterprises. On the other hand, the second round of purchase restriction policy had a negative impact on the leverage of real estate enterprises.

(2) The purchase restriction policy indirectly affects the leverage of real estate enterprises by influencing house prices in the purchase restriction cities. During the first round, house prices were not suppressed, and house sales were not affected. In contrast, during the second round, the purchase restriction policy had a significant negative impact on both house prices and sales, causing real estate enterprises to adjust their business strategies and reduce their leverage.

(3) The first round had no effect on the short-term and long-term debt servicing ability. However, the second round enhanced the short-term solvency to some extent but increased the long-term solvency. This indicates that although the second round curbed housing prices and reduced the leverage, it reduced the solvency and increased debt risk in the long term. This is why many real estate enterprises experienced debt crises in recent years, and the purchase restriction policy is not a long-term solution.

6.2 Policy Recommendations

The study's findings suggest that although real estate restriction policy can reduce the leverage of real estate enterprises, they increase the debt risk in the long run, which is not conducive to the long-term sound operation. Therefore, the study proposes the following recommendations:

First, long-term, market-oriented real estate regulation and control policies should be developed. The two rounds of purchase restriction policy were only implemented for a short period and did not have the desired effect. The government should shift from purely administrative control means to a market-led mechanism and accelerate the supply-side reform of the real estate industry to promote balanced supply and demand.

Second, the strength of real estate regulation and control policies must be carefully considered. The real estate industry is a pillar industry in China, with high leverage, high cash flow needs, and high risk. When implementing regulation, the debt risk of the real estate industry and the cascading effect on other industries should be considered. Before implementing regulatory policies, the timing and scope of regulation should be carefully evaluated. During implementation, changes in the risk of real estate firms should be monitored to prevent liquidity risk and debt crises.

Third, financing channels for real estate enterprises should be expanded. The successful implementation of the purchase restriction policy has weakened the long-term solvency of real estate enterprises and increased their debt risk, primarily due to their reliance on bank credit financing channels. Therefore, China should broaden the financing channels of real estate enterprises, replace debt financing with equity financing, optimize their capital structure, and regulate bank credit financing.

References

[1] R. Liang, D. Zhang, X. Fang and X. Lin (2021). *Do Purchase Restriction Policies Reduce the*

Corporate Value of Listed Real Estate Companies? Journal of Financial Research, vol.494, no.8, p.42-60.

[2] S. Zheng, G. Han and G. Shi (2016). *Housing Purchase Restrictions and Firm Default Risks. The Journal of World Economy, vol.39, no.10, p150-173.*

[3] X. Fang (2018). *Is House Purchase Limit Effective to Control Housing Price in China?—An Empirical Study Based on 70 Large and Medium Cities. Finance & Economics, no.1, p41-53.*

[4] B. Zhou and C. Zhou (2019). *Land Finance, Corporate Leverage and Debt Risk. Finance & Trade Economics, vol. 40, no. 3, p19-36.*

[5] Altman E. *Financial Ratios (1968), Discriminant Analysis and the Prediction of Corporate Bankruptcy. The Journal of Finance, vol.23, no.4.*