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Tax substitution: The impact of home-purchase restrictions on corporate tax burden

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ABSTRACT

The purpose of this study is to determine the relationship between local fiscal pressure and the actual tax burden of enterprises. Using China's home-purchase restriction policy as a quasi-experiment, this study assesses the impact of the policy on firms' tax burdens in affected areas and researches the relationship between local fiscal pressure and the actual tax burden of enterprises. Drawing from 2006-2014 financial data of Chinese listed companies and using a difference-in-differences approach, the findings show: (1) the policy significantly improved the actual tax burden of enterprises and increased the actual tax burden by around 0.7%; (2) this effect is stronger in areas with stricter restrictions, smaller cities, and the property sector, including related industries; (3) as a response to reduced fiscal revenue from the policy, local governments have adopted tax increase measures such as strengthening collection and management and settling the arrears of taxes, which have promoted the actual tax burden of enterprises. From the perspective of financial pressure, this paper reveals the path for local governments to release financial pressure, which has reference value for interpreting local government behaviors under the Chinese "pressure" financial system and provides a theoretical basis for improving local government governance, reducing government discretion space, and optimizing the business environment.

Contribution/Originality: Many studies have discussed the concepts of home-purchase restrictions and corporate tax burdens. The novelty of this study lies in its impact on the actual tax burden of enterprises and whether there is tax substitution leading to an increase in the actual tax burden of enterprises.

1. INTRODUCTION

The Chinese real estate market has witnessed persistently high prices with an ongoing upward trend, drawing extensive attention from both the public and academia (Tsai & Chiang, 2019; Wei & Chiu, 2018; Zhang & Pan, 2021; Zou, 2022). However, the rapid growth of the real estate industry not only led to surging property prices but also posed adverse effects on overall economic development (Davis, Huang, & Sapci, 2022; Deng, Girardin, & Joyeux, 2018; Ouyang & Zhou, 2023; Wu, Heerink, & Yu, 2020; Zhang et al., 2019; Zhou, Chen, Yang, & Song, 2021). To stabilize the property market, the State Council issued notifications in 2010, 2011, and 2013 that introduced market regulation measures, including purchase restrictions. In order to curb the excessive rise in housing prices in certain cities, the central government issued the "New Ten Articles" [1], "National Five Articles"[2]

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[1] State Council Notice on Resolutely Curbing the Rapid Rise of House Prices in Some Cities, National Development [2010] No. 10.

and "New Eight Articles" [3] on real estate in 2010 and 2011. These policies require cities where housing prices are too high, rising too fast, and where housing supply is tight to limit the number of housing units that households can purchase within a certain period of time. If local governments fail to implement these policies and work effectively, the central government will interview local government officials and hold them accountable. Since then, 30 cities have successively issued purchase restriction measures of varying degrees, including provincial capital cities as well as third-tier cities such as Zhoushan, Jinhua, and Wenzhou. Some second- and third-tier cities have only introduced purchase restriction policies (purchase only), and some cities, in addition to purchase restrictions, have also added proof of residence and tax payment certificates for non-natives purchasing houses (purchase restrictions with additional conditions). By the end of 2011, a total of 46 cities had implemented home-purchase restriction policies.

The implementation of real estate purchase restrictions as a pivotal measure for government control in the real estate market primarily suppresses the surge in housing prices within restricted zones. Its inhibitory impact exhibits strong regional characteristics, manifesting variations at the urban level (An, Zou, Zhang, & Gupta, 2019; Du & Zhang, 2015; Gong, De Haan, & Boelhouwer, 2020; Jia, Wang, & Fan, 2018; Sun, Zheng, Geltner, & Wang, 2017; Yuan, Wu, Wei, & Wang, 2018). Chen, Hui, Seiler, and Zhang (2018) found that the purchase restriction policy can restrain the housing price in the current period, but the change in population structure will eventually lead to a housing price rise. Li, Sun, and Boersma (2019) found that China's real estate purchase restriction policy has significant spillover effects within urban agglomerations.

Somerville, Wang, and Yang (2020) show that, compared with non-restricted areas, restrictions significantly reduce the number of individual housing purchases. Zheng, Chen, and Yuan (2021) observed that China's housing purchase restrictions demonstrate spatial externalities in non-restricted cities adjacent to restricted ones. Such policies redirect housing demands to nearby non-restricted cities, resulting in a 10.3% increase in land prices in adjacent cities. Zhao and Zhang (2022) discovered that real estate purchase restrictions significantly reduce local government land leasing revenues. Faced with fiscal pressure, local governments are compelled to bolster tax enforcement to augment tax revenue.

Chen, Mo, Tang, and Li (2023) showed that the rise of REPU (Chinese Real Estate Policy Uncertainty Index) led to a decline in the growth rate of commercial residential development investment, sales area, and added value of the real estate industry.

Since the home-purchase restriction policy is issued by the central government of China and the local government does not have the ability to predict it in advance, the policy is naturally exogenous and can be regarded as having an exogenous impact, which greatly alleviates the endogenous problem in the research. This paper treats the policy as a quasi-natural experiment and employs a multi-period Difference-in-Differences (DID) approach to identify the impact of purchase restrictions on corporate tax burdens. The utilization of a multi-period DID is primarily based on two considerations.

First, from 2010 to early 2011, central government successively released the "New Ten Articles," "National Five Articles," and "New Eight Articles" prompting various local governments to respond by rolling out purchase restrictions. The fact that these property market rules came from outside the market greatly reduced endogeneity concerns. This created a unique institutional setting for analyzing the effects of the purchase restrictions. Second, cities rolled out these policies at different times, including the second quarter of 2010 (Q2), 2010 Q4, 2011 Q1, and 2011 Q3. Therefore, using a multi-period DID allows for a more effective assessment of the policy's impact.

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[2]Notifications by the Ministry of Housing and Urban-Rural Development, Ministry of Land and Resources, and Supervision Department on Further Implementation of National Development [2010] No. 10, Housing Construction [2010] No. 155.

[3]State Council General Office Notification on Further Issues Related to Real Estate Market Regulation, State Office Issue [2011] No.1.

2. DATA AND ESTIMATION STRATEGY

2.1. Data Sources

In late 2014, China lifted the purchase restriction policy, which means that when residents purchase housing and handle the relevant contract filing and housing registration business from 2015 on, there is no need to provide proof of household housing information query, and the number of houses is no longer limited. Since 2016, China has launched the second round of purchase restriction policies, which are significantly different from the first round.[4] To exclude the impact of the second round, this paper only considers the impact of the first promulgation of the purchase restriction policy. This study employs micro-level data from Chinese listed companies from 2006 to 2014 and macro-level data from prefecture-level cities. Corporate data is sourced from the China Stock Market & Accounting Research (CSMAR) database[5]. Data for prefecture-level cities are primarily obtained from the China City Statistical Yearbook, with missing values supplemented by respective prefecture-level cities' National Economic and Social Development Statistical Bulletins. Housing price data at the prefecture level is extracted from the China Statistical Yearbook for Regional Economy over the years, while land transfer income data comes from the annual China Land & Resources Almanac.

The data underwent the following processing steps: First, exclusion of financial sector-listed companies as well as special treatment (ST) and particular transfer (PT) companies. Second, remove samples with missing actual tax rates, actual tax rates below 0, and actual tax rates above 1. Third, elimination of samples lacking relevant financial metrics. Additionally, to mitigate the influence of outliers in the financial data, this study trims all financial metrics at the 1% and 99% percentiles. After such processing, the final dataset includes 1,984 company samples across 218 cities, totaling 11,193 observations. Table 1 displays the descriptive statistics for the main variables.

Table 1. Descriptive statistics of variables.

Variables	Definition	Obs.	Mean	Std. dev.	Min.	Max.
Etr	(All taxes paid-refund of taxes received)/Operating income	11193	0.074	0.063	0.000	0.991
Etr2	Moving average of net corporate tax cash flow in year t/Operating income	11193	0.077	0.069	0.000	0.987
Reform	0-1dummy variable	11193	0.454	0.498	0.000	1.000
Size	Ln (Total assets of enterprise)	11193	21.768	1.324	18.888	25.917
Roa	Operating profit/Total assets	11193	0.045	0.097	-4.417	0.775
Lev	Total liabilities of enterprises/Total assets	11193	0.469	0.360	0.016	13.648
Ppe	Net fixed assets/Total assets	11193	0.232	0.178	0.000	0.971
Age	Ln(Year-year of establishment+1)	11193	0.362	0.000	4.094	0.362
Lnloan	Ln(Surplus of loans from financial institutions at the end of the year)	11193	17.911	1.446	14.466	19.988
Ind	Tertiary industries' value-added/Secondary industries'value-added	11193	1.381	0.950	0.131	4.136
Houseprice	Urban commercial housing sales/Commercial housing sales area	11193	8.908	0.679	6.216	10.116
Lnland	Ln (Land transaction price)	11193	1.427	10.754	16.825	1.427

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[4]The differences are as follows. First, the first round of purchase restriction policy is a top-down unified regulation, the central government issued a purchase restriction notice, and the local government promoted the implementation through the pilot, which has nothing to do with the tax burden level at theenterprise level.Therefore, the first round of purchase restriction policy reform can capture the exogenous changes of local fiscal pressure and effectively overcome the endogenous bias caused by missing variables and reverse causality. Second, the second round of purchase restriction policies are measures implemented by the city, and local governments independently control the initiative of policy formulation and implementation, which cannot guarantee the purity of policy implementation.

[5]Available from: https://www.gtarsc.com/

2.2. Model Settings

This study employs a multi-period DID approach for regression analysis. The econometric model is defined as:

$$etr_{ict} = \alpha_0 + \alpha_1 policy_{ct} + \beta X_{ct} + \delta Z_{ict} + \mu_i + \gamma_t + \varepsilon_{ict} \quad (1)$$

Within the specific model, the subscripts i, c, and t represent firms, prefecture-level cities, and time periods correspondingly. etr_{ict} signifies the tax rate imposed on the enterprise for the fiscal period t. Furthermore, $policy_{ct}$ denotes the interaction term coupling the policy dummy variable with the time dummy variable. If the city c in which the company is located enforces a real estate purchase limitation policy within the year t, it is assigned a value of 1; contrarily, it is assigned 0. The coefficient α_1 measures the impact of the restriction policy shock on the actual tax burden of companies and is the primary focus of this study. X_{ct} stands for city-level control variables that vary over time, specifically including the year-end loan balance of financial institutions (lnloan) and industry structure (ind). Z_{ict} represents firm-level control variables, encompassing firm size (size), profitability (roa), financial leverage (lev), intensity of fixed assets (ppe), and firm age (age). μ_i and γ_t respectively represent firm fixed effects and time fixed effects. ε_{ict} is the random error term, with standard errors clustered at the city level.

3. EMPIRICAL ANALYSIS

3.1. Basic Results Analysis

Table 2 delineates the regression results of the multi-period DID analysis as formulated in Equation 1. In this tabulation, Column (1) delineates the model bereft of exogenous controls variables. Sequentially, Column (2) introduces firm-level control variables, and Column (3) further incorporates city-level control variables. The empirical findings consistently manifest a statistically robust and positive coefficient for the policy interaction term at the 1% significance level across all specifications. This empirical evidence posits that the enactment of the restriction policy has notably exacerbated the actual tax burden on enterprises by approximately 0.7%.

Table 2. Baseline model regression results.

Variables	Baseline results			Robustness checks	
	(1)	(2)	(3)	(4)	(5)
	Dependent variable (Etr)			Dependent variable (Etr2)	Changing sample range
Policy	0.008***	0.008***	0.007***	0.006**	0.005*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size	–	0.002	0.002	-0.017***	0.002
		(0.003)	(0.003)	(0.004)	(0.002)
Roa	–	0.039***	0.039***	0.011	0.037***
		(0.009)	(0.009)	(0.008)	(0.010)
Lev	–	-0.006	-0.006	-0.004	-0.002
		(0.005)	(0.005)	(0.003)	(0.002)
Age	–	-0.038***	-0.038***	-0.038***	-0.048***
		(0.009)	(0.009)	(0.009)	(0.014)
Ppe	–	-0.017	-0.017	-0.017	-0.018*
		(0.011)	(0.011)	(0.014)	(0.011)
Lnloan	–	–	0.003	0.003	0.010
			(0.008)	(0.008)	(0.007)
Ind	–	–	0.009*	0.002	0.014**
			(0.005)	(0.005)	(0.006)
_Cons	0.070***	0.130	0.063	0.479***	-0.029
	(0.001)	(0.080)	(0.185)	(0.159)	(0.170)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	11193	11193	11193	11193	8418
R-squared	0.679	0.685	0.685	0.670	0.708

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

3.2. Parallel Trends Test and Dynamic Effects Analysis

A key assumption of the DID approach is the parallel trends assumption. To verify this, we conducted the following test:

$$etr_{ict} = \sum_{k=2006}^{2014} \alpha_k \times policy_{c\ t} + \beta X_{ct} + \delta Z_{ict} + \mu_i + \gamma_t + \varepsilon_{ict} \quad (2)$$

Using the previous period of the sample as the reference year for estimating the model, the coefficients α_k are depicted in Figure 1. With the year preceding the implementation of the restriction policy as the base year, there was no significant impact on the actual tax burden of firms before the reform. However, starting from the pilot year of the reform, the actual tax burden of firms was noticeably affected, showing a significant positive impact. This influence diminishes by the third period post-pilot, indicating that the elevating effect on the actual tax burden caused by the restriction policy gradually weakens. These findings affirm that the DID model constructed in this study satisfies the parallel trends assumption.
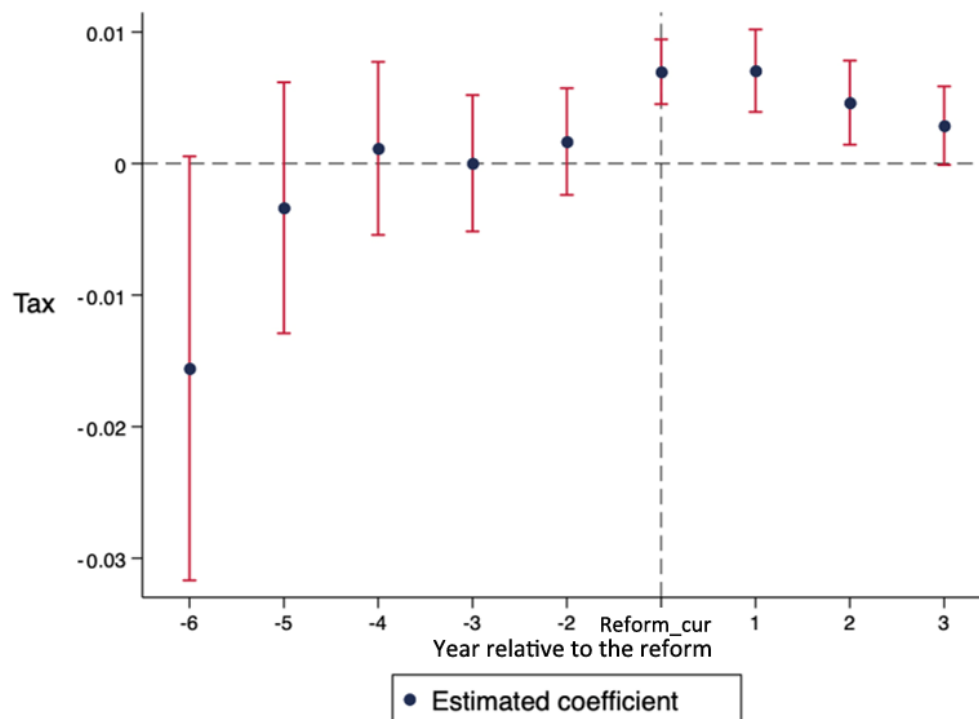

Figure 1. Dynamic effect on firm's tax.

Note: This figure reports the estimates of the dynamic effect of the restrictions reform on firm's tax derived from an event study approach. Relative year -1 is omitted, so all of the estimates should be interpreted relative to the first year prior to the reform. The blue solid circles plot the point estimate and the red solid lines plot the 90% confidence intervals.

3.3. Changing the Dependent Variable

We re-calibrated the regression using the metric for the actual tax burden level of enterprises, which we designated as etr2, which is the average tax net cash flow over the preceding three years divided by business revenue. The robustness check results are shown in Column (4) of Table 2. The coefficient of the fiscal pressure explanatory variable is significantly positive. The empirical results align well with the baseline regression outcomes, providing further support for our hypothesis.

3.4. Modifying the Sample Scope

To eliminate the potential influence of the samples from the four municipalities of Beijing, Shanghai, Chongqing, and Tianjin on the study results and ensure the validity of our conclusions, we excluded these four municipalities and reran the regression. The results are presented in Column (5) of Table 2. The sign of the estimated coefficient for the core explanatory variable, the restriction policy, remains consistent with the baseline

regression. This indicates that the implementation of the restriction policy in other cities also leads to an increase in the actual tax burden for local enterprises, maintaining the robustness of our results.

3.5. Placebo Test

By creating an experimental group through random sampling, we conducted a placebo test to further investigate whether certain uncontrollable factors are influencing our regression results. Specifically, we randomly drew samples from the entire dataset, matching the number of samples in the original treatment group, and generated random policy implementation times. We constructed a new treatment group where both the city and the timing of the restriction policy were randomized. We then re-estimated the model and randomly repeated the experiment 500 times, resulting in a distribution graph of regression coefficients and p-values, as depicted in Figure 2. The placebo test outcomes demonstrate that the randomized regression coefficients and their corresponding P-values both exhibit characteristics of a normal distribution with a mean of zero. The randomized coefficients are to the left of the actual estimated coefficients, demonstrating that the restriction policy's implementation was the sole cause of our result.
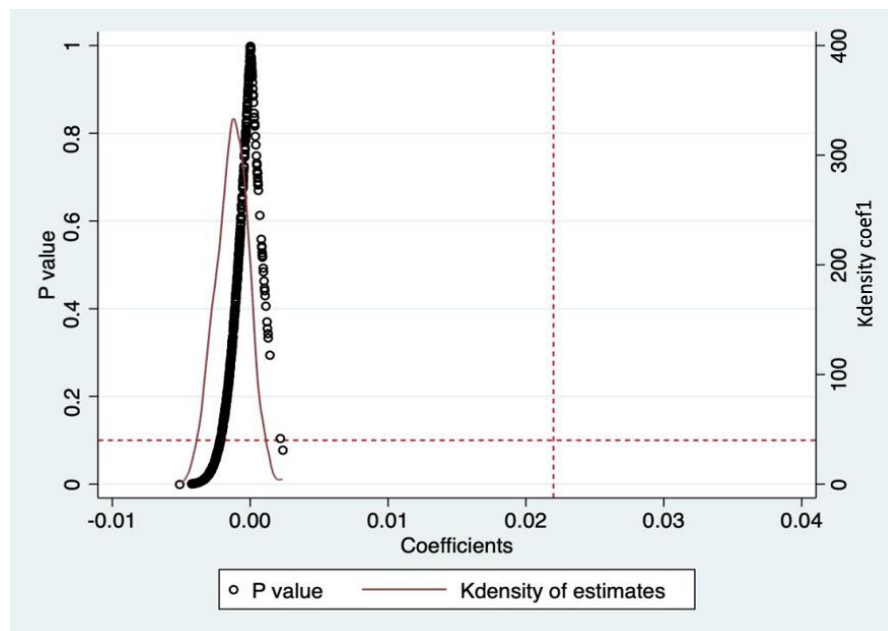

Figure 2. The distribution graph of regression coefficients and p-values.

3.6. Goodman-Bacon Decomposition

Existing literature has discussed the biases that arise in multi-period DID estimates under bi-directional fixed effects (Baker, Larcker, & Wang, 2022). Such biases might occur if the treatment effects vary over time. The combination of varying treatment times and fluctuating effects can lead to potential distortions in multi-period DID estimates.

To determine the degree of bias in multi-period DID estimates under bi-directional fixed effects, this study uses the DID estimator decomposition method that Goodman-Bacon (2021) introduced. The results (Figure 3 and Table 3) indicate that the restriction policy has led to an increase in the tax burden for enterprises within the jurisdiction.
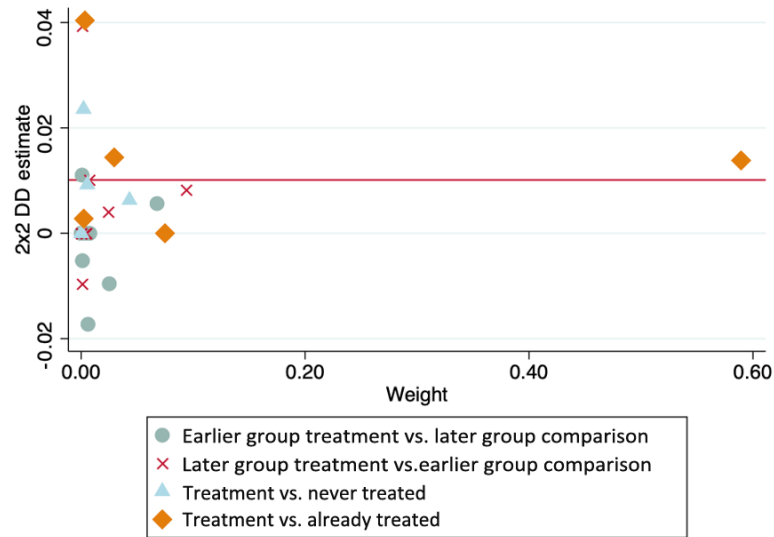
Figure 3. Goodman-Bacon decomposition analysis.

Table 3. Goodman-Bacon decomposition results.

DID comparison	Weight	Avg DID est.
Earlier T vs. later C	0.113	0.000
Later T vs. earlier C	0.136	0.007
T vs. never treated	0.051	0.007
T vs. already treated	0.699	0.012

3.7. Exclusion of the Influence of Other Policies

Given the significant reforms that took place during our sample period, the following three policies might influence our results: firstly, the implementation of the Golden Tax Project III (GTP III)[6]; secondly, the impact of the county-to-district (C2D) reform[7]; and thirdly, the effects of the Business Tax to Value-Added Tax (B2V) reform[8].

To isolate the potential impacts of these policies, we conducted several checks. Firstly, since China rolled out the GTP III in phases from 2013 to 2016, we constructed a dummy variable, that GTP III. If a province began implementing this project in year t, then the GTP III takes a value of 1 from that year onwards; otherwise, its value is 0. By further controlling for the GTP III in the regression, the results are shown in Column (1) of Table 4. Secondly, to exclude the effects of the C2D reform, we additionally controlled for C2D in our regression, as presented in Column (2) of Table 4. Finally, to lessen the effect of the B2V reform, we adopted two approaches: a) we added dummy variables for the provinces and years of B2V implementation in the regression, with results shown in Column (3) of Table 4, and b) excluding industries that implemented B2V, specifically transportation and business services sectors, and rerunning the regression, with results in Column (4) of Table 4. The outcomes demonstrate that the coefficient for the purchase restriction policy remains positive and significant at the 1% level.

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[6]The Golden Tax Project III is a system that uses a computer network covering tax authorities across the country to closely monitor special value-added tax (VAT) invoices and corporate VAT payment status. GTP III facilitates tax authorities to inspect, manage and monitor tax sources to reduce and prevent tax losses (Jiang, Huang, & Wang, 2023).

[7]C2D reform is an administrative method of urbanization in China, and it generally means that municipalities or prefecture-level cities change the counties under their jurisdiction into municipal districts and incorporate them into the central area of the city. The overriding purpose of C2D is to improve the level of urbanization and promote economic development.

[8]The full implementation of Business Tax to Value-Added Tax (B2V) reform is an important part of China's structural reform, forcing the reform of the fiscal and taxation system. The B2V reform has led to a decrease in the share of tax revenue of local governments, which in a rigid expenditure scenario has put enormous pressure on local finances.

Table 4. Exclusion of the influence of other policies.

Variables	(1)	(2)	(3)	(4)
	GTP III	**C2D**	**B2V**	
			B2V impact controlled	**B2V industries removed**
Policy	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.008*** (0.002)
GTP III	-0.005*** (0.002)	–	–	–
C2D	–	-0.002 (0.002)	–	–
B2V	–	–	0.003 (0.003)	–
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects (FE)	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	11193	11193	11193	10590
R-squared	0.685	0.685	0.685	0.683

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***indicates significance at 1%.

3.8. Heterogeneity Effects

Firstly, we examined the heterogeneous impacts of purchase restriction policies based on the varying intensities of their implementation across different cities. The results are presented in Table 5. Column (1) displays the regression results for cities that only implemented purchase restrictions without imposing residency limitations compared to non-restricting cities (Limit intensity level 1, LIL1). Column (2) showcases cities that implemented both purchase and residency restrictions versus non-restricting cities (LIL2). Column (3) presents cities that not only imposed purchase and residency restrictions but also issued multiple purchase restriction measures (LIL3). The findings indicate that as the intensity of purchase restrictions increases, the tax burden on enterprises also rises.

Table 5. Heterogeneity analysis-intensities of implementation.

Variables	(1)	(2)	(3)
	LIL1	**LIL2**	**LIL3**
Policy	0.007 (0.005)	0.007*** (0.002)	0.008*** (0.002)
Control variables	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	2900	8223	6974
R-squared	0.717	0.675	0.673

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***indicates significance at 1%.

Secondly, we analyzed the effects of restriction policies on cities of different sizes, with results shown in Table 6. Column (1) explores the impact of these policies on the 4 first-tier cities. Column (2) investigates the effects on 15 second-tier cities (excluding first-tier cities), while Column (3) examines the impact on third-tier cities (excluding both first- and second-tier cities). Column (4) looks into the influence on other cities that don't fall within the first, second, or third tiers. The results suggest that the impact of purchase restrictions on the tax burden level of enterprises is primarily evident in cities other than the first-tier. The influence on first-tier city enterprises is not significant. One potential reason for this could be that the four major first-tier cities-Beijing, Shanghai, Guangzhou, and Shenzhen-already have substantial economic scales and diverse fiscal revenue sources. Purchase restrictions don't exert fiscal pressure on their local governments, eliminating the need to boost actual enterprise tax burdens

by intensifying tax collection measures. On the other hand, the marketization levels in these four cities are higher, limiting the discretionary power of local tax authorities.

Table 6. Heterogeneity analysis-cities of different sizes.

Variables	(1) First-tier cities	(2) Second-tier cities	(3) Third-tier cities	(4) Other cities
Policy	0.003 (0.003)	0.017*** (0.003)	0.005* (0.003)	0.013* (0.005)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3588	2904	2548	140
R-squared	0.586	0.627	0.682	0.690

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***and * indicate significance at 1%and 10%.

In contrast, due to greater fiscal pressures and broader discretionary powers in second and third-tier cities, local governments can adjust their tax collection efforts. In practice, they might adopt measures like strengthening tax collection and pressing for tax arrears, impacting the corporate tax burden. Furthermore, local government officials frequently take resources from lower-level governments or businesses in order to achieve their goals and improve organizational capabilities. Some local governments even directly levy various taxes and fees on enterprises within their jurisdictions to capture tax revenues, resulting in a heightened actual tax burden borne by local enterprises.

Lastly, we investigated whether there were heterogeneous effects of the purchase restriction policies across different industries. According to the industry classification by the China Securities Regulatory Commission in 2012, we divided the sample industries into three categories: real estate, industries directly related to real estate[9], and industries indirectly related to real estate[10]. The regression results are presented in Table 7. Column (1) displays the impact of the restriction policies on the property sector. Column (2) presents the effect on industries directly related to real estate. Column (3) shows the impact on industries indirectly related to real estate. The findings reveal that the purchase restriction policies significantly influence the tax burden of businesses in the real estate sector and its directly related industries. However, their impact is not significant on industries that are indirectly related (or unrelated) to real estate. A plausible explanation for these findings is that, under the current tax distribution system, land transfer fees remain a crucial source of revenue for local governments. Coupled with an assessment system centered on GDP, local governments are keen on developing the realty industry. When the implementation of purchase restrictions leads to a decrease in local land financial income, it prompts the local governments to resort to "tax substitution" behaviors. Essentially, to maintain their revenue streams, they seek to

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[9] Industries directly related to real estate include: Black metal mining and smelting, Mineral mining and processing, Chemical raw materials and chemical product manufacturing, Warehousing and transportation, Building decoration and other construction industries, House construction, Electrical machinery and equipment manufacturing, Electricity, gas, and water production and supply, Non-ferrous metal mining, smelting, and processing, Non-metallic mineral products, Metal products, General andspecialized equipment manufacturing, Civil engineering construction, Rubber and plastic products, Wood processing and manufacturing, Instrument and meter manufacturing, Retail and wholesale, Accommodation and catering.

[10] Industries indirectly related to real estate include: Telecommunications, Broadcasting, television, and satellite transmission services, Pharmaceutical manufacturing, Textiles and apparel, Decoration industry, Software and Information Technology services, Food manufacturing, Automobile manufacturing, Ecological protection and environmental management, Paper and printing, Agriculture, forestry, animal husbandry, and fishing services, Oil exploration, smelting, and processing, Railways, shipbuilding, aerospace, and other transportation equipment manufacturing, News and publishing.

raise funds by increasing taxes, leading to a higher tax burden on businesses in the property sector and industries directly associated with it.

Table 7. Heterogeneity analysis-different industries.

Variables	(1)	(2)	(3)
	Real estate	Industries directly related to real estate	Industries indirectly related to real estate
Policy	0.057***	0.004*	0.002
	(0.018)	(0.002)	(0.002)
Control variables	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	792	5372	4790
R-squared	0.402	0.636	0.718

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; *** and * indicate significance at 1% and 10%.

3.9. Mechanism Test

This section primarily investigates the mechanism through which purchase restrictions affect corporate tax burdens. Given that land finance is a significant source of extrabudgetary revenue for local governments, the restriction policies have led to a decline in the growth rate of housing prices. The continuation of land finance relies on the premise of obtaining revenue through one-time land sales, which requires conditions conducive to high land prices. When residential land is sold at high prices, housing prices rise to support these high land costs. However, when housing prices decrease, the prices of residential lands decline, leading to reduced land finance revenue. As local financial incomes decrease, fiscal pressures intensify. Given the inflexibility of expenditures, a feasible strategy for local governments is to intensify tax collection efforts on local businesses, resulting in an increased actual tax burden on companies.

To understand this mechanism, we examined it from the perspectives of land finance and housing prices. The regression results are presented in Tables 8 and 9. Table 8 indicates that purchase restrictions reduce the income from land sales and the area of land sold, subsequently leading to a decrease in housing prices. The results of Table 9 show that as local financial income decreases and fiscal pressures rise, local governments resort to measures such as intensifying tax collection and clearing tax arrears, resulting in an increased actual tax burden on businesses.

Table 8. The influences of purchase quota policies on local land transfer and house price.

Variables	Land transfer fee	Transferred land area		House price		
	(1)	(2)	(3)	(4)	(5)	(6)
	Land transfer fee	Transferred land area	Industrial estates	T0 house price	T1 house price	House price growth rate11
Policy	-0.292**	-0.262***	-0.017	-0.020	-0.066***	-0.052*
	(0.117)	(0.059)	(0.067)	(0.026)	(0.013)	(0.031)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11193	11142	8553	11193	9605	9025
R-squared	0.913	0.853	0.901	0.988	0.989	0.368

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

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[11] The growth rate of housing prices = (Current housing price – previous housing price) / Previous housing price.

Table 9. The impacts of purchase quota policies on local fiscal.

Variables	(1)	(3)	(4)
	Public revenue	VFI[12]	Etr
Policy	-0.071*	0.019**	–
	(0.036)	(0.009)	
Policy×VFI	–	–	0.007***
			(0.002)
Control variables	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11193	11193	11193
R-squared	0.994	0.749	0.685

Note: The regression results are based on the robust standard errors of clustering at the city level; Standard errors are in parentheses; ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

4. CONCLUSIONS

This study takes China's home-purchase restriction policy as a natural experiment to explore its impact on the corporate tax burden of China's listed companies from the perspective of tax substitution. We find that, compared with non-restricted areas, purchase restrictions significantly increased the actual tax burden of enterprises in reform pilot areas. In addition, we find that purchase restrictions lead to a decrease in local fiscal revenue and an increase in fiscal pressure. Local governments will resort to taxation instead, resulting in an increase in the actual tax burden of enterprises.

The conclusions drawn in this study offer the following policy implications: Firstly, there's a need to establish sustainable local revenue sources and enhance the local tax system. This involves nurturing local tax bases and gradually shifting the collection of consumption taxes to local governments based on the reform plan, which divides revenues between the central and local authorities. Increasing the proportion of direct taxes, primarily income tax and property tax, is imperative. Secondly, it's crucial to refine the transfer payment system and optimize its structure. Tailoring support to financially weaker regions based on their fiscal situation is essential to balancing the financial disparities between regions. Accelerating the establishment of novel modes of interactive development among regions, enhancing regional assistance mechanisms, engaging in paired support, and effectively promoting the collective development of both developed and underdeveloped regions are imperative. Thirdly, diversifying local government financing channels is necessary. It involves reasonably determining local government debt limits based on diverse regional economic and social development needs. Improving the management of government bond issuance, optimizing the variety and maturity structure of local government bonds, and encouraging the issuance of long-term special bonds are essential steps. Encouraging and moderately promoting the issuance of offshore renminbi (RMB) bonds by local governments to align local bond markets with international standards and foster the development of offshore RMB bond markets is recommended. Introducing social capital to broaden project funding sources, leveraging the advantages of various investment entities, reducing government financing pressures, and enhancing the fiscal efficiency of local governments are key areas. Fourthly, advancing the construction of a rule-of- law government and refining the business environment are crucial. Underlining strategic enforcement behavior by local governments regarding taxes and fees under the home-purchase restriction policy hampers enterprises' ability to achieve high-quality development through fair and open market competition. It's essential to enhance operational efficiency within the institutional system by establishing an open and transparent legal environment and weakening or eliminating unreasonable institutional interferences. The construction of a rule

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[12]The calculation of vertical fiscal imbalance (VFI) is based on the method used by Li and Du (2021) defined as VFI = 1 - (revenue decentralization / spending decentralization) × (1 - fiscal gap rate).

of law government ensures a fair and just legal business environment. These conclusions hold valuable reference significance for developing countries worldwide aiming to regulate speculative behavior in real estate markets.

Admittedly, the regression data in this study cannot be updated to the latest year because of the first round of the purchase restriction policy. The measurement of the actual tax burden of enterprises in this paper is also based on the data from 2006 to 2014. If the data can be extended to the most recent year, the law of local government expenditure behavior can be more effectively revealed. The empirical analysis of this paper focuses on the dimension of prefecture-level cities in China and examines the impact of the real estate purchase restriction policy on the tax burden of enterprises without considering the financial pressure at the county level, which has more expenditure responsibilities and faces greater financial pressure. If the behavior of county-level governments is studied, the content will be richer and more comprehensive.

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