The Impact of Purchase Restrictions Policy on Real Estate Market: Evidence from China

Yang Liu
Guanghua School of Management
Peking University

Abstract

Using city level monthly data from January 2009 to October 2012, this paper investigates the impact of purchase restrictions policy on real estate market in China. By difference-in-difference approach, we find that this restriction policy suppresses both the trading price and quantity in the short run, however, in the long run the price rebounds while quantity doesn't. Potential explanations of this difference between short-term and long-term effect lay in the decrease in supply and those newly issued policies which may induce a counter effect. Our paper contributes to a better evaluation of the current purchase restrictions policy from the perspective of both short and long run. Our findings may give policy makers some directions for further policy implementation.

Keywords: Purchase Restrictions Policy; Trading Price; Trading Quantity

INTRODUCTION AND LITERATURE REVIEW

The average house price in China has been increasing by 9% annually when taking inflation into account, which draws a vast body of attention by the government as well as the public. Literature analyzed this rapid growth of housing price from numerous perspectives, like the misallocation of asset (Wang (2011)), the possible price bubbles (Yu (2011); Ren, Xiong, and Yuan (2012)) or even the high saving rate puzzle (Wang and Wen (2012)). The house price in China has deviated far from the economic fundamentals as argued by a strand of literature like real interest rate, income, employment,price variables, real GDP per capita, etc (see Case and Shiller (1990); Riddel (1999); Himmelberg, Mayer, and Sinai (2005); Hwang and Quigley (2006); Zhang, Hua, and Zhao (2012)). There is a growing concern that the house in China is mispriced; concretely, the real estate is overpriced and although there is little agreement reached on how big the bubble is (Yu (2011); Ren, Xiong, and Yuan (2012); Wu, Gyourko, and Deng (2012)).

The overpricing in real estate market could cause economy some detrimental effect. First of all, the distortedly high price induces the wealth transfer from rural area to urban and from households to government through increasing rent and government tax, which is likely to increase the income inequality and therefore harms the economy(Kanbur and Zhang(1999),Sicular et al(2007)). Secondly, the skyrocketing house price might account for the high saving rate (Wang and Wen (2012)), which is pernicious to the economic structure of China. At present, China is on the path of transition from export/invest-oriented to consumption-oriented economy. The expansion of the domestic demand is a long run endeavour of Chinese government. A soaring up house price without limit and the high saving rate are against the purpose of the Chinese economy transition. Thirdly, the continuously and irrationally increasing of house price could incite more firms to be engaged in investment into the real estate industry and thus discourage their innovation, which is the source of economic

growth in the long run. Last but not the least, the recent financial turmoil occurred in United States which then translated into the entire globe remind us the catastrophic influence of the melt down of housing bubbles. Yao, Luo, and Morgan (2010) has warned that the similarity of housing markets in China and US (movements of interest rates and house prices, and the exposure of some Chinese banks to the US mortgage securitization market) might expose China to domestic mortgage lend ing-relate d crises due to its underdeveloped financial system although the differences of China and Western Countries make the US-style credit and housing market crisis unlikely happen in the near future. As a consequence, the Chinese government launched a sequence of programs more strict chronologically to curb the house price so that it doesn't go wild, especially after the financial crisis, as 2009 witnesses a strong rebound of economy accompanied by the house price.

There are two kinds of policy instruments to choose from: (1) the price policies like regulations of rent or price; (2) quantity policies such as zoning (regulation of land use, Glaeser, Gyourko, and Saks (2005)) and purchase restriction. European countries tend to implement policies on provident house and rental markets, while US target on the housing finance market. Asian economies intervene the house market too, like Korea launched the program of price regulation and random lot from 1972-2000, Singapore adopt provident houses to majority of people and Hong Kong also carried out the regulation of rental houses after World War II. Chinese government decided to implement the quantity policy, i.e., the purchase restrictions, in order to deal with the fast uprising house price from April 2010 in its first round notice, yet the prefectural governments didn't respond until the last round notice took place on January 26th 2011.

The literature evaluating the housing policies is abundant, Landis and McClure (2010) describe the history of housing policies in US and evaluate these programs, they find that government often implement conflicting policies so that the effectiveness are discounted; Yu and Lee (2010) study the housing policy impacts on the real state market and argue that the policy aiming at stabilize the property price is ineffective. The housing policies in China has received an increasing attention too. Deng, Shen, and Wang (2011) provide a thorough summary of the three affordable housing programs, the Economical and Comfortable Housing (ECH) program, the Housing Provident Fund (HPF) program, and the Cheap Rental Housing 2 BACKGROUND

(CRH) program while evaluating the effectiveness of the policies. The purchase restrictions have gradually been discussed recently. Liu, Zhang, and Huang (2012) and Wang and Bao (2012) construct different models on housing market and find that purchase restrictions could lower the property price through some simulations, Wang and Huang (2013) employ a dynamic model which also document a decrease in house price as the consequences of the purchase restrictions. Nevertheless, given these studies are innovative in addressing the purchase restrictions policy, their conclusions are based on simulations rather than real data except that in Wang and Huang (2013) in their endeavor to examine their theoretical findings empirically with data from National Bureau of Statistics of China. Hence, we are far from reaching a thorough understanding of the policy effectiveness despite its importance; what is the policy impact on the house trading price and quantity, and in which way does the policy take effect?

In this paper, we seek to examine the policy impact of the house purchase restrictions. In other words, how can this policy affect housing price and trading volume? Does this policy effective lower the price as the government expected? To this end, we employ monthly panel data from January 2009 to October 2012 encompassing sixty-six prefecture cities with difference in

difference (DID) approach. We document robust evidence that in the short run the policy suppresses both the trading price and quantity while in the long run the price rebounds and quantity goes down further. We further argue that decrease in housing supply, the counter-policies as well as secondhand house substitution may contribute to explain such phenomenon.

Comparing with the existing literature, our paper contributes in the following significant ways. First of all, we systematically evaluate the house purchase restriction policy with solid empirical methods in the first time. Our sample encompasses sixty-six cities and almost all of the cities that implemented the policy are included (39/41). We also use DID approach and Propensity Score Matching (PSM) method which yield robust results. Second, we point out that decrease in housing supply, the counter-policies as well as secondhand house substitution may explain the decrease in trading price and quantity in short run and rebound of price as well as further decline in quantity in the long run. The results confirm the short run effect as well as long run limitations of the policy: if government wishes to deal with the overpricing of real estate fundamentally, it might resort to the three long-term affordable housing programs mentioned before, i.e., the Economical and Comfortable Housing program, the Housing Provident Fund program, and the Cheap Rental Housing program as summarized in Deng, Shen, and Wang (2011).

The remainder of the paper proceeds as follows. Section 2 gives a detailed background of the purchase restrictions policy. Section 3 describes the data and empirical specification. Section 4 presents the results as well as discusses the potential channels by which the policy affects the house trading price and quantity.
Section 5 concludes and derives further discussion of the paper.

BACKGROUND

Chinese government keeps an eye on the housing market persistently, especially from the 2009 economic resurgence which is accompanied by the rapid rise in house price. The State Council of China introduced.

"Notice on Curbing Excessive Growth in Property Prices in Some Cities" ("National Ten Clauses") on April 17th 2010 in order to regulate the speculative investments in real estate market. However the first round of policies received little feedbacks from the local governments, only cities like Beijing implemented the corresponding purchase restriction policy and property price resumed its growth in August. Then on September 29th Ministry of Housing and Urban-Rural Development, Ministry of Land and Resources and Ministry of Supervision jointly issued "Four Requirements on Further Implementation in Curbing the Property Price Hikes in Some Cities" unveiled the second round of regulations which received moderate responses from the local government, nonetheless the local governments only applied the policies to commodity houses. Finally the State Council Executives Meeting chaired by Premier Wen on January 26th 2011 carried out "Notice on Further Regulations of Real Estate Market by General Office of State Council", clarified the duties of local government to impose the purchase restrictions on houses.

The contents of the notice are featured by the clauses like "Implement the purchase restrictions policy in a certain period of time", "Households who own one house and less can buy an additional house if they are either local residents or can prove their long term stay in the city through tax payments", "Stop providing houses for households who own two houses and more as well as thoses who can't prove their long term stay". Local governments then

implemented the policy literally allowing for minor modifications according to the concrete situations of different cities. The different versions of Purchase Restriction Policies have in common that: (1) residents are denied of additional houses if they have already one house (2) the policy covers both newly built houses as well as secondhand houses and (3) the regulation is effective regarding to their Hukou status. We presents the details of the policy in Table 1.

Table 1: The Details of Purchasing Restriction Policy

For Local Residents:	If they own one house (the owner being husband, wife or their adolescent children) then they could buy one additional house; If they own two houses and more, then they shall be denied of further purchase. The policy covers both newly built house and secondhand house.
For Nonlocal Residents:	If they could provide evidence that they have been the city for a couple of years through either tax or insurance payments, they might buy an additional house if they own one house and less. Else (either they can prove their long term stay yet have two houses or more or they are unable to prove their long term stay), they shall be denied of house purchase.

DATA AND MODEL SPECIFICATION

The data used in this paper are mainly from China Index Academy, which is a prestigious institute that compiles the real estate data. This data set has been employed in a few studies like Coulson and Tang (2013). Our data originate from January 2009 to October 2012 covering 66 cities. The details of the cities and those that implemented the purchase restrictions can be found in Appendix A. The control variables are from the China Monthly Statistics from National Bureau of Statistics of China.

The variables exploited in this study mainly concern the newly built houses, we document the average trading prices, quantities of these cities. To examine the effect of the policy, we generate a dummy $d_{i,t}$ which takes value 1 if the city i implement the policy at time t. Meanwhile, we obtain the control variables like consumer price index cpi as price variables may matter (Liu, Zhang, and Huang (2012); Wu, Gyourko, and Deng (2012); Zhang, Hua, and Zhao (2012)), fixed asset investment growth rate fai and per capita GDP in logarithm loggdp to indicating the economic situation (Case and Shiller (1990); Hwang and Quigley (2006); Wu, Gyourko, and Deng (2012)), investment in house in logarithm loghouseinv to further indicate the fundamentals (Riddel (1999); Hwang and Quigley (2006); Yu and Lee (2010); Liu, Zhang, and Huang (2012); Wen and Goodman (2013)). Due to the availability of the data, the control variables are mainly from the data of the province the cities belong to. Since the supply of the houses is non-negligible (Glaeser, Gyourko, and Saks (2005); Hwang and Quigley (2006); Sinn (2008)) in the analysis of the total effect, we also collect the area of new houses supply and take log logsupmkt and sold supply ratio sold supp ratio. The dummy dt is an indicator that takes value 1 if the year is 2012.

Table 2 presents the summary statistics of variables with their definitions. It is clear that the trading quantity is more volatile than average price, and there is no conspicuous outliers.

Table 2: Summary Statistics

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
$logprice\_new$	Log(Average Trading House Prices)	2171	8.84	0.48	7.38	10.3
$logarea\_new$	Log(Average Trading Areas of Houses)	2278	3.34	1.01	-0.02	5.71
$d_{i,t}$	The Purchase Restriction Policy Dummy	2820	0.26	0.44	0	1
cpi	Consumer Price Index	2820	102.72	2.58	95.8	107.7
fai	Fixed Asset Investment Growth Rate(%)	2816	26.07	11.09	-20.6	216.4
$loggdp$	Log(GDP)	2756	8.18	0.97	4.71	9.66
$loghouseinv$	Log(Investment in House)	2812	5.09	1.03	-3	6.87
$logsupmkt$	Log(Area Supply of New Houses)	1091	3.7	1.01	-2.12	5.88
d_t	The Dummy for 2012	2820	0.23	0.42	0	1
$sold\ supp\ ratio$	Sold Supply Ratio	1092	1.45	3.8	0.07	115.75

Data come from China Index Academy.

THE RESULTS

Let i be the individual identifier and t be time identifier, the panel models we employ are:

$$p_{i,t} = \alpha_p + \beta_p d_{i,t} + \gamma_p X_{i,t} + u_{i,t}, u_{i,t} = \mu_i + v_{i,t}, v_{i,t} \sim N(0,\sigma^2) \quad (1)$$

$$q_{i,t} = \alpha_q + \beta_q d_{i,t} + \gamma_q X_{i,t} + u_{i,t}, u_{i,t} = \mu_i + v_{i,t}, v_{i,t} \sim N(0,\sigma^2) \quad (2)$$

where $p_{i,t}$ and $q_{i,t}$ correspond to logprice $new_{i,t}$ and logarea $new_{i,t}$ respectively, $X_{i,t}$ are control variables such as $cpi_{i,t}$, $fai_{i,t}$, $loggdp_{i,t}$, $loghouseinv_{i,t}$ and since the panel is long and seasonal (monthly data), we control further for the time trend t and monthly dummies dum_j with j = 1,2,·,12. The parameters of interest are β_p and β_q, and each standard error is clustered to the city level since we employ the DID method (Bertrand, Duflo, and Mullainathan (2004)).

The Baseline Regression

Table 3 presents the baseline regressions results, we append the lagged term into model considering their potential presence (see also Hwang and Quigley (2006); Wen and Goodman (2013)). One can see that the policy is not effective in terms of price while it suppresses the trading quantity; when regress price on $d_{i,t}$, the coefficient estimates are insignificant while regress quantity on $d_{i,t}$ then estimates are significant at 1% level. Moreover, the significantly negative impact on quantity is not only statistical salient, but also meaningful economically: due to the purchase restrictions policy, the quantity traded declined substantially by about 20%.

The estimates of coefficients on control variables are intuitive: the inflation positively affect the price while negatively influence the quantity. The good economic situation (higher GDP per capita or more investment in house constructions) positively affect the trading price and quantity; their effect is positive and significant in some cases. As time goes by, the price level goes up, the coefficient estimates are positive and significant at 1% level.

The results reported in Table 3 are somehow surprising which are in contrast to what Liu, Zhang, and Huang (2012), Wang and Bao (2012) and Wang and Huang (2013). We then examine the comparative "shortrun effect" of the policy whose span is similar to the previous

Chinese literature (Liu, Zhang, and Huang (2012); Wang and Bao (2012); Wang and Huang (2013)); we select the period before 2012 to investigate the short run effect of the policy since (1) 2012 almost divide the post policy implemented period equally for most of the cities implemented the policy on February 2011 and (2) in 2012 the central government issues some policies that exert counter effect on the real estate market of the policy. Table 4 demonstrates the results.

We can see that the results of quantity are similar to the whole sample while the short run effect of the policy on house price is statistically significant at 10% level; the short run effect of the policy is verified. Concretely, in the short run the house price dropped by about 4% due to the purchase restrictions while

Table 3: Baseline (The Whole Sample)

| VARIABLES	(1)	(2)	(3)	(4)
			new logarea new	logarea new
lo $d_{i,t}$	-0.0280	-0.0253	-0.217***	-0.198***
$logarea\_new\_lag$	(0.0210)	$gprice\_$	(0.0673)	(0.0618)
		-0.0105		
		(0.0121)		
		)		
logprice new lag				-0.481***
				(0.156)
cpi	0.0261***	0.0260***	-0.0652***	-0.0521***
	(0.00295)	(0.00270)	(0.00895)	(0.00961)
fai	-0.000185	0.000185	-0.00171	-0.00282
	(0.000807)	(0.000833)	(0.00306)	(0.00280)
loggdp	0.131***	0.125***	0.137	0.171
	(0.0387)	(0.0359)	(0.164)	(0.176)
loghouseinv	0.00147	0.00372	0.0858***	0.0818***
	(0.00498)	(0.00537)	(0.0179)	(0.0200)
t	0.00602***	0.00566***	0.00407	0.00573
	(0.00104)	(0.00101)	(0.00340)	(0.00360)
Constant	4.882***	4.970***	8.542***	11.25***
	(0.475)	(0.411)	(1.513)	(1.727)
Monthly Dummies	Yes	Yes	Yes	Yes
Observations	2,107	2,044	2,208	2,043
R-squared	0.578	0.571	0.230	0.239
Number of code	66	66	66	66

Data come from China Index Academy. Robust standard errors in parentheses clustered to city level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 4: Baseline (Before 2012)

VARIABLES	(1)	(2) new	(3) logarea new	(4) logarea new
lo... $d_{i,t}$	-0.0460**	-0.0346*	-0.229***	-0.166***
$logarea\_new\_lag$	(0.0197)	$\imath gprice_-$	(0.0659)	(0.0598)
		-0.00639		
		(0.0128)		
		)		
logprice new lag				-0.378**
				(0.178)
cpi	0.0149***	0.0202***	-0.0404***	-0.00857
	(0.00428)	(0.00472)	(0.00977)	(0.0113)
fai	-0.000343	-7.69e-05	-0.00159	-0.00278
	(0.000714)	(0.000756)	(0.00291)	(0.00288)
loggdp	0.142***	0.129***	0.00975	0.0349
	(0.0422)	(0.0385)	(0.167)	(0.177)
loghouseinv	0.00221	0.00521	0.101***	0.0971***
	(0.00467)	(0.00503)	(0.0215)	(0.0199)
t	0.0102***	0.00808***	7.41e-05	-0.00757*
	(0.00162)	(0.00179)	(0.00423)	(0.00426)
Constant	5.844***	5.628***	7.204***	7.065***
	(0.603)	(0.570)	(1.530)	(1.853)
Monthly Dummies	Yes	Yes	Yes	Yes
Observations	1,598	1,536	1,675	1,532
R-squared	0.622	0.620	0.189	0.226
Number of code	66	64	66	64

Data come from China Index Academy.
Robust standard errors in parentheses clustered to city level.
*** p<0.01, ** p<0.05, * p<0.1.

Sample Selection

quantity declined by less than 20%. The coefficient estimates on the control variables are similar to the whole sample.

Sample Selection
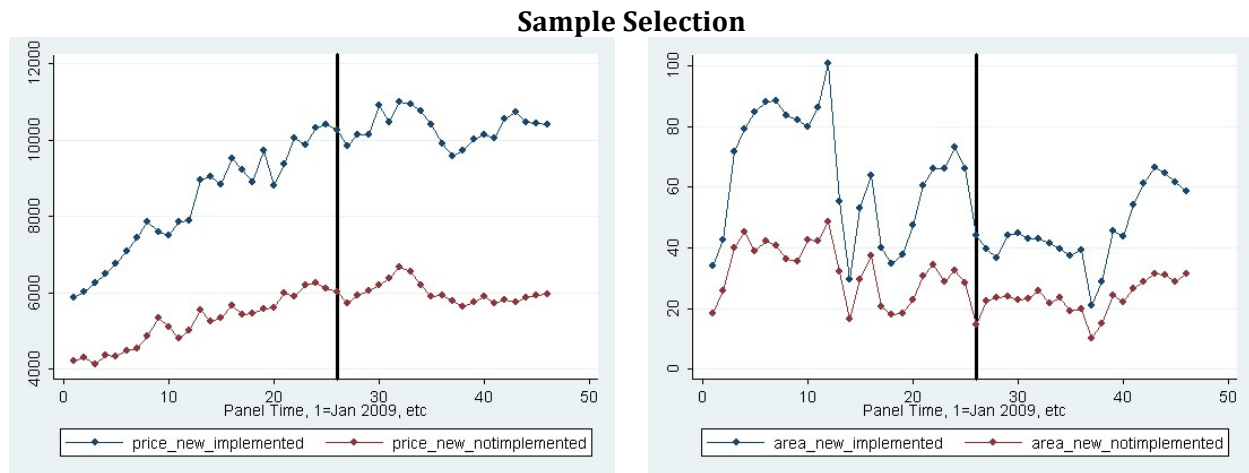
(a) The House Trading Price (in Yuan)   (b) The House Trading Volume (in squared meters)
Figure 1: House Trading Price and Quantity

A potential threat to our identification is the selection problem and the treated group is randomly assigned: the cities that implemented the policy might be those whose house prices are high before the implementation of the policy; if such argument holds, then our estimates are inaccurate. Figure 1 illustrates the patterns of two groups of cities are quite similar given that the price gap is not narrowed down while the quantity gap is substantially reduced, the visual detection is similar to the baseline regression results. However, we have to admit that prices of cities that implement the policy are growing faster since the slope is larger, the selection problem might exist .

To address the problem, we employ the propensity score matching (PSM) method with DID as did in Galiani, Gertler, and Schargrodsky (2005). We first run probit model of the policy dummy onto an extensive list of covariates in order to calculate the propensity scores, and Panel A in Table 5 reports the results of detection for the selection.

Surprisingly, we can see that observables are insignificantly affecting the possibility of selection into the treated group, i.e., the cities that implemented the policy except the price level cpi and time trend. According to Galiani, Gertler, and Schargrodsky (2005), if the obervables are insignificant, then it is likely that the unobervables will not affect the selection either; hence in our sample, the selection issue is not severe.

Figure 2 exhibits the matching results visually: we see that the propensity scores of those off the support are less than 0.2 or larger than 0.8. For those on the support, we find that for each bin of the score, the treated (policy-implemented cities) and untreated (policy-non-implemented) are proportional. Panel B in Table 5 reports additional checks on the matching results, and we find that the differences among the variables drop substantially, with investment in house construction turn to insignificant statistically.
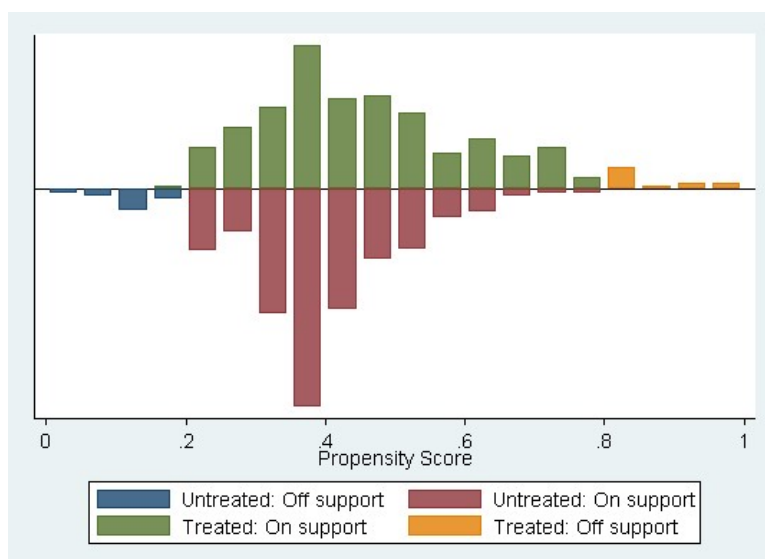
Figure 2: The Propensity Matching Scores

Panel C in Table 5 shows the PSM results, we find that the policy effect on both price and quantity resembles the baseline and the magnitudes of the estimates are quite similar, although the short run effect on price becomes insignificant. It should be noted that what we estimate is the lower bound of the policy effect, as we know the selection exists and those whose prices are high ex ante are likely to be chosen for policy implementation. We document robust results that the trading price is likely to be driven down by the policy in the short run yet rebounds in the long run; the trading quantity is decreasing steadily after the policy implementation.

DISCUSSIONS
The Effect on Demand-Supply
A simple demand-supply model serves as one possible explanation for the phenomenon. When the policy comes, the demand curve of the house shift downwards while supply curve cannot adjust so quickly since they have started to sell. In this case, we see that the price and quantity both drop in the short run. As time goes by, the suppliers are able to adjust their behavior, that is to provide less houses onto the market, then Table 5: The Propensity Score Matching (DID and PSM)

Panel A: Probit Model Regressions	(1)	(2)	(3)	(4)
	$d_{i,t}$	$d_{i,t}$		
	0.536***	0.760***	0.490***	0.715***
	(0.111)	(0.0841)	(0.122)	(0.0945)

$logprice\_new\_lag$	_____	0.0141	-0.000615	0.000997
$logarea\_new\_lag$				
cpi				
fai				
$loggdp$				
$loghouseinv$				
t				
	(0.0220)	(0.0198)	(0.0232)	(0.0216)
	-0.0449	0.0676	0.00500	0.102
	(0.181)	(0.158)	(0.203)	(0.180)
	0.0902	0.0407	-0.0161	-0.0710
	(0.175)	(0.154)	(0.262)	(0.237)
	0.351***	0.300***	0.309***	0.274***
	(0.0315)	(0.0202)	(0.0334)	(0.0225)
Constant	-70.28***	-92.81***	-72.90***	-95.10***
	(11.90)	(9.327)	(13.98)	(11.11)
Observations	2,168	2,744	1,540	2,053
Number of code	66	66	64	66

Panel B	Difference Unmatched		Difference Matched	
Matching Results	t-stat	p-value	t-stat	p-value
cpi	19.02	0.000	7.46	0.000
fai	-7.74	0.000	-6.94	0.000
$loggdp$	1.59	0.111	-0.55	0.583
$loghouseinv$	4.57	0.000	1.55	0.121

Panel C: Regression Results	Before 2012		Whole Sample	
VARIABLES	logprice new	logarea new	logprice new	logarea new
$d_{i,t}$	-0.034	-0.321**	-0.041	-0.284**
	(0.071)	(0.150)	(0.057)	(0.124)
Observations	958	987	1220	1264
R-squared	0.329	0.133	0.345	0.118

Data come from China Index Academy.
Robust standard errors in parentheses clustered to city level.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) logsupmkt	(2) logsupmkt	(3) logsupmkt	(4) logsupmkt
d_t(year>=2012)	-0.516***	-0.496***	-0.511***	-0.499***
	(0.0938)	(0.0867)	(0.0982)	(0.0920)
logarea new lag		0.205***		0.205***
		(0.0542)		(0.0507)
sold supp ratio lag			-0.00247	-0.00393
			(0.00237)	(0.00295)
cpi	-0.0343*	-0.0240	-0.0315*	-0.0228
	(0.0189)	(0.0176)	(0.0182)	(0.0177)
fai	0.000539	0.00154	0.00214	0.00184
	(0.00134)	(0.00125)	(0.00151)	(0.00122)
loggdp	-0.409*	-0.520**	-0.504**	-0.492**
	(0.217)	(0.210)	(0.214)	(0.209)
loghouseinv	0.161	0.188**	0.208***	0.181**
	(0.105)	(0.0728)	(0.0705)	(0.0709)
t	0.0274***	0.0281***	0.0274***	0.0277***
	(0.00591)	(0.00538)	(0.00572)	(0.00540)
Constant	8.671***	7.614***	8.837***	7.339***
	(1.958)	(1.985)	(2.024)	(1.987)
Observations	1,120	1,083	1,066	1,066
R-squared	0.303	0.320	0.307	0.321
Number of code	36	36	36	36

Data come from China Index Academy.
Robust standard errors in parentheses clustered to city level.
*** p<0.01, ** p<0.05, * p<0.1.

one can see that in the long run the quantity declines while the price remains at the previous level. In this analysis, we stress the importance of supply side, as we know, if we ignore the supply, we might encounter the problem of "Green Paradox"; the policies aim at reducing the carbon release turn out to "encourage" even more emission (Sinn (2008)).

As our cutoff time is Year 2012, we test our hypothesis by regressing the supply on the dummy indicating 2012, i.e. dt. Table 6 examines our argument on the supply side. The coefficients estimates on the dt confirms our conjecture, they are significant at 1% level with an economically salient magnitude; the supply drops substantially after year 2012 by almost 50%. The estimates stay virtually unchanged for all the four regressions, controlling the lag term of trading quantity, lag of sold supply ratio and both or not. It is intuitive that the more suppliers sold in the last time, the more they are willing to supply on the market.

Our results correspond to what Glaeser, Gyourko, and Saks (2005) and Hwang and Quigley (2006) argue, the supply side is important in affecting the house price; it is likely that the downward shift supply curve that drives the price back to the previous status in the long run.

The Accompanying Policies
We should admit that the verified hypothesis in Section 4.3.1 serves as only one of the interpretations of the policy effect. There are at least three alternative ones to be uncover, even though they might not be tested due to the data availability or the shortage of variation of the variables. These alternative explanations are mainly the accompanies policies implemented in year 2012 that act to counter the effect of purchase restrictions; the central government launched these policies in order to keep the economic growth rate. Similar to Landis and McClure (2010), we think it is possible that the conflicting policies nullify the purchase restrictions in the long run.

The First Down Payment. According to our survey of different cities in China, we find that from 2012 the down payment of the houses are lowered down, some cities like Shenzhen, Guangzhou, Nanjing, Wuhan, Heifei, Huizhou and among other 19 cities witnessed a decrease in down payment ratio up to about 20%. The loosen of the down payment might be a driven factor of the house price rebound, as Chen, Li, and Qiu (2013) mentioned.

The Interest Rate. Central bank has decided to cut the required reserve rate twice and interest three times; the strong signal to pump the economy. Moreover, quite a few banks (Bank of China, Agricultural Bank of China, Industrial and Commercial Bank of China) lowered down the mortgage rates, and discounted by 15% in cities like Shanghai, Beijing and Guangzhou. The effect of interest rate on the real estate market has been identified by a huge body literature, like Himmelberg, Mayer, and Sinai (2005), Yao, Luo, and Morgan (2010), etc. The decreasing interest rate could contribute to drive up the house price additionally.

The Fiscal Policy. The fiscal policy involves the local government behavior; as the real estate market plays an essential role in local economy Wu, Gyourko, and Deng (2012), these local governments have incentive to make lenient fiscal policies to pump up the economy as well as revitalize the housing market. Concretely, some local governments rebate the tax related to the house purchase, subsidize the house purchase together with some other deregulation measures. The conflicting policies of central and local ones might be another factor in affect the long run effect of purchase restrictions.

CONCLUSION
In this paper, we evaluate the effect of purchase restrictions policy on house trading price and quantity. We find that in the short run, the policy suppresses both trading price and quantity while in the long run, the price recovers while the quantity doesn't. Our paper suggests that the purchase restrictions could only serve as a temporary policy, to curb the house price in a more fundamental way, the government might consider other long term programs like the Economical and Comfortable Housing program, the Housing Provident Fund program, and the Cheap Rental Housing program.

Nevertheless, we should admit a major drawback of our research is that we ignore the important role of the land and rent market for simplicity as well as the data availability, the two markets have been crucial in real estate market in quite a few works Glaeser, Gyourko, and Saks (2005), Wang and Bao (2012), Wu, Gyourko, and Deng (2012), Wang and Huang (2013) and Wen and Goodman (2013). Therefore, further studies are needed. First, we should

consider the role of land, which is an indispensable determinant (Glaeser, Gyourko, and Saks (2005); Wu, Gyourko, and Deng (2012); Zhang, Hua, and Zhao (2012); Wen and Goodman (2013)). Second, the rental market needs attention since another hot issue is the price-to-rent ratio, the rental market might also influence the real estate market (Wang and Bao (2012); Wu, Gyourko, and Deng (2012); Wang and Huang (2013)). Third, we need to model the policy mathematically, Wang and Bao (2012) and Wang and Huang (2013) provide potential directions. Fourth, we need more detailed data with better quality, we might further investigate the policy effect with data from Statistical Yearbooks.

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CITY LIST
Table 7: City List

Beijing*	Tianjin*	Tangshan	Cangzhou	Langfang	Taiyuan*	Huhhot*
Baotou	Shenyang*	Dalian*	Changchun*	Jilin	Shanghai*	Nanjing*
Wuxi*	Xuzhou*	Changzhou	Suzhou*	Nantong	Lianyungang	Zhenjiang
Ningbo*	Wenzhou*	Shaoxing	Hefei*	Wuhu	Guichi	Fuzhou*
Xiamen*	Quanzhou	Zhangzhou	Nanchang*	Jinan*	Qingdao*	Dongying
Yantai	Weifang	Zhengzhou*	Luoyang	Jiaozuo	Nanyang	Wuhan*
Huangshi	Yichang	Xiangyang	Changsha*	Yueyang	Guangzhou*	Shenzhen*
Zhuhai	Foshan*	Huizhou	Dongguan	Zhongshan	Nanning*	Liuzhou
Beihai	Haikou*	Sanya*	Chongqing	Chengdu*	Luzhou	Nanchong
Kunming*	Xi'an*	Lanzhou*				

Data come from China Index Academy.
Cities with "*" are those implemented the purchasing limit policy