Property Rights and Housing Market

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Motivation

- Property rights institutions have a first-order effect on long-term economic growth, investment, and financial development (e.g., Acemoglu and Johnson, 2005; Galiani and Schargrodsky, 2010).
- The lack of formal and well-defined property rights impedes the use of land as collateral (Besley, 1995) and the transformation of wealth into capital (De Soto, 2000).
- In this paper, we investigate the value of property rights in one of the largest land and housing market in the world - the Chinese market.

Motivation

- Chinese economy is now ranked No. 2 in size, yet in some aspects its economic structure is still transitional, e.g. the dual property rights that coexist in China's housing markets:
  - Full property rights (FPR) takes the predominant form, with its urban buyers entitled to use, possess, collateralize, and dispose of property during a 70-year lease.
  - Land with limited property rights (LPR) can only be transacted within its local cooperative society or village committee.
- As of 2012, about 20 percent of China's total housing stock has LPR (NBS, 2013).
  - The fraction is much higher in cities such as Shenzhen, which has expanded rapidly mainly through the conversion of rural land.

Research Questions

- How does the market price property right uncertainty?
- Is it possible that property right uncertainty may have contributed to the rapid home price appreciation in China because such uncertainty in property rights leads to speculative activities?
  - Limited property right housing units differ in uncertainty and frictions from the full property right units: compare the turnover rates and price volatility.

The History

- All lands in the urban areas are owned and distributed by the state or state-owned enterprises (SOEs) – "class of hammer" until 1994.
- Lands in the rural areas are collectively owned and distributed by villages – "class of sickle".

Expansion of Chinese Cities

- Massive urbanization is realized primarily through the expansion of urban boundaries into rural area.
- When a rural county is incorporated into the city, rural land can be acquired and used for urban development by the government.

Origin of Limited Property Rights

- LPR arises when
  1. The original owner of the rural land, a cooperative society or village committee, develops dwellings in partnership with a private developer;
  2. Individual farmers build extra floors or rooms on their own land for resale or rental purposes;
  3. Private developers acquire collective land for new developments.

Legal Implications of Limited Property Rights

- Because LPR flats are not legally transferable, no transaction-related taxes are levied upon settlement.
- Since the transactions of LPR properties are not legally sanctioned, they are not subject to any housing purchase restriction policies.
- The owners of LPR properties who do not belong to the village committee are not guaranteed access to infrastructure and public amenities.
- LPR properties owners are not allowed to collateralize their property to take out mortgages or tap the housing provident fund.
- Most importantly, while FPR owners are entitled to compensation by the government in the case of enforced demolition, this is not the case for LPR owners.

City of Shenzhen

- Located adjacent to Hong Kong, it was incorporated in 1979 and now one of China's four tier-one cities.
- Shenzhen is the very first city in mainland China to have implemented a land financing model as early as the early 1990s.
- LPR units account for a significant share, as high as 60 percent, of the city's total housing stock.
- The availability of the *building census* data in Shenzhen provides a unique opportunity to identify the exact property rights for almost all the dwellings in the city.
- Unlike other cities, LPR communities are geographically overlapped with FPR ones in Shenzhen.

Urban Planning Codes

- Despite the marketization reform, China has largely maintained its tradition of a five-year planning process for budget planning.
- Shenzhen started its five-year urban planning as early as 2006.
  - Its first two five-year urban planning codes (2006–2015) focused primarily on increasing the total housing supply.
  - In the 2011–2015 planning codes, the municipal government identified communities for planned demolition, but did not make it public.
  - On November 21, 2016, the government released the 2016–2020 urban planning codes, including both the text and maps.
- This provides a valid setting for studying the effect of government regulation on property rights.

Source of Variations Exploited by the Paper

- We first estimate the relative prices listed for LPR flats compared to their FPR counterparts. Rents at community level are used as a placebo outcome.
- We then examine whether and how this is affected by government regulations. Main channel is different demolition code applied to similar communities.
- Marginal willingness to sell may be different from marginal willingness to buy given different take on the law change.

Results Preview

- We find that properties with LPR are listed at a significant discount. We do not find any statistically significant differences in the placebo outcome of monthly rents.
- Following the implementation of the new codes, the relative price of LPR units increases significantly, by approximately nine percentage.
- Our heterogeneity analysis suggest that planned demolition is the primary channel for the estimated effects.
- Following the rollout of the new codes, both market turnover and price volatility declined.

Related Literature

- Giglio, Maggiori, and Stroebel (2015) estimate the price discount of leaseholds with maturities ranging from 99 to 999 years relative to perpetual ownership contracts in freeholds. These are unique features of residential housing markets in the United Kingdom and Singapore.
- Our study joins a growing microeconomics literature that explores the pathways through which particular institutions influence investment or productivity (e.g., Besley, 1995; Goldstein and Udry, 2008; Galiani and Schargrodsky, 2010).

Building Census Data

- In 2015, Shenzhen conducted a building census, the first of its kind in the country.
- The census covers all 4,615 gated communities within city limits and surveyed a broad range of questions about complexes. Among these, 3,173 (or 86.2 percent) communities have FPR, 430 (or 11.7 percent) have LPR.
- We use the Nearest Neighbor Matching to match neighborhoods with different property rights,. The matching process produces a total of 338 pairs of communities.

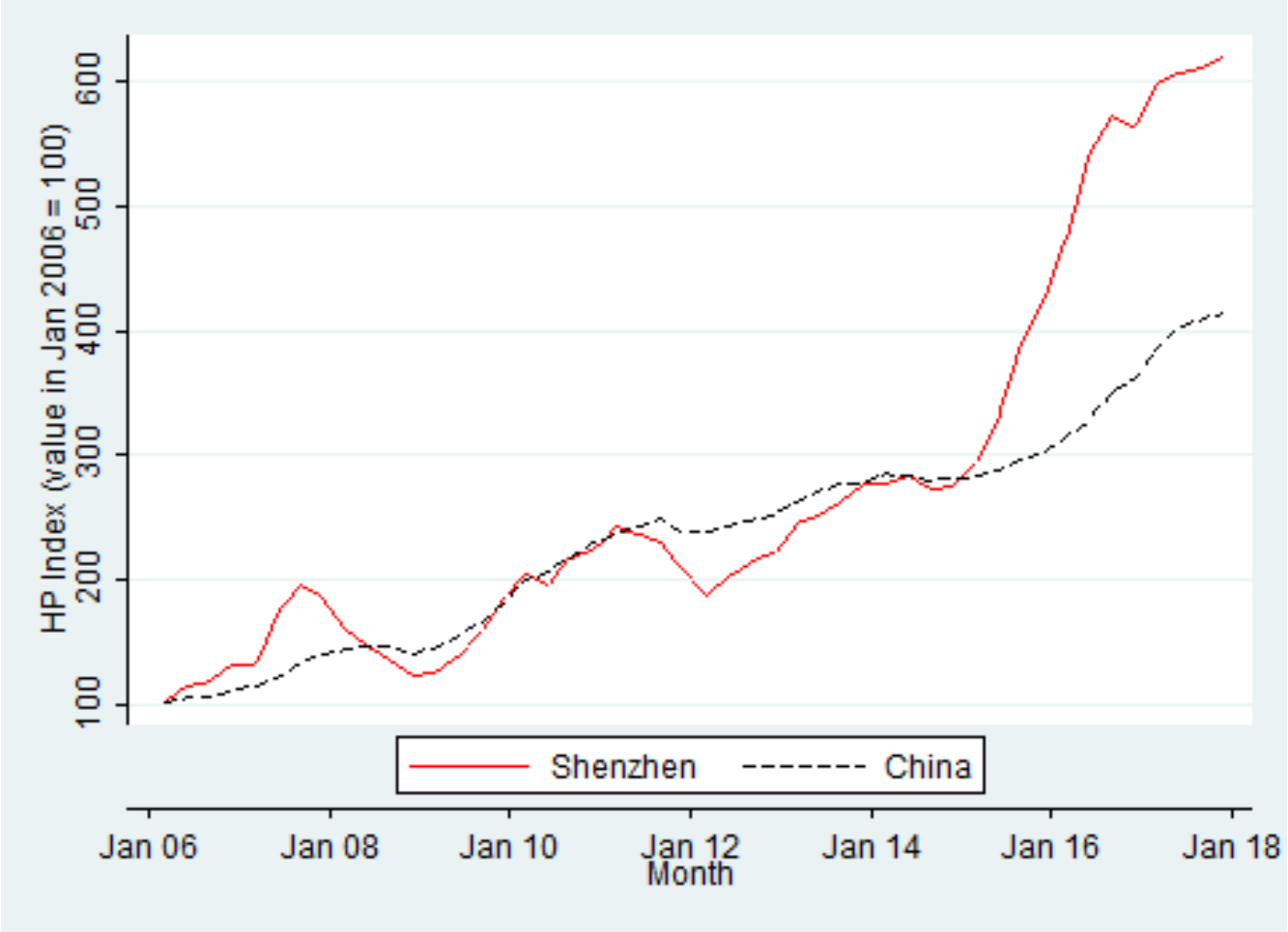
Listings Data

- Because of their illegal nature, LPR flats are not legally permitted.
- Our primary data source is the listing records from January 2015 through December 2017 that cover LPR and FPR flats in Shenzhen.
- Information in listing data is very similar to MLS in the United States except sale outcomes such as days on the market and sale price.
  - Structural characteristics of the unit
  - Location
  - Listing Date
- Our data provides nearly complete coverage of listings during the period. Final sample contains 570,458 listings in Shenzhen.

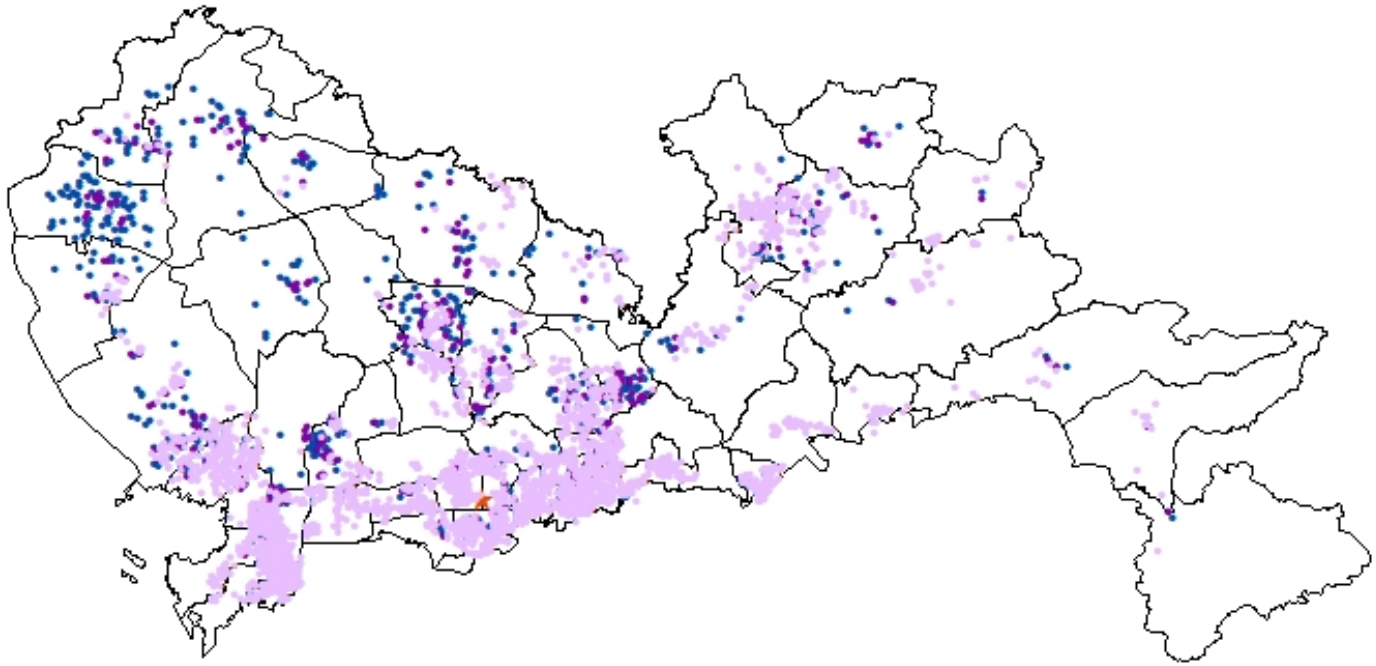
Exogenous Variation

- We exploit Shenzhen's 2016–2020 urban planning codes, which contain the community names that are assigned different demolition codes. Expected demolition affects dual property rights differently.
  - Priority demolition zone
  - Previous demolition zone
  - Demolition or improvement zone
  - Restricted demolition zone
  - Ecological control zone
  - No code
- While compensation is always expected for FPR units, it was not expected previously for LPR units due to its illegal nature. Now all of sudden, they are expected to receive some compensation.

Home Price Indexes

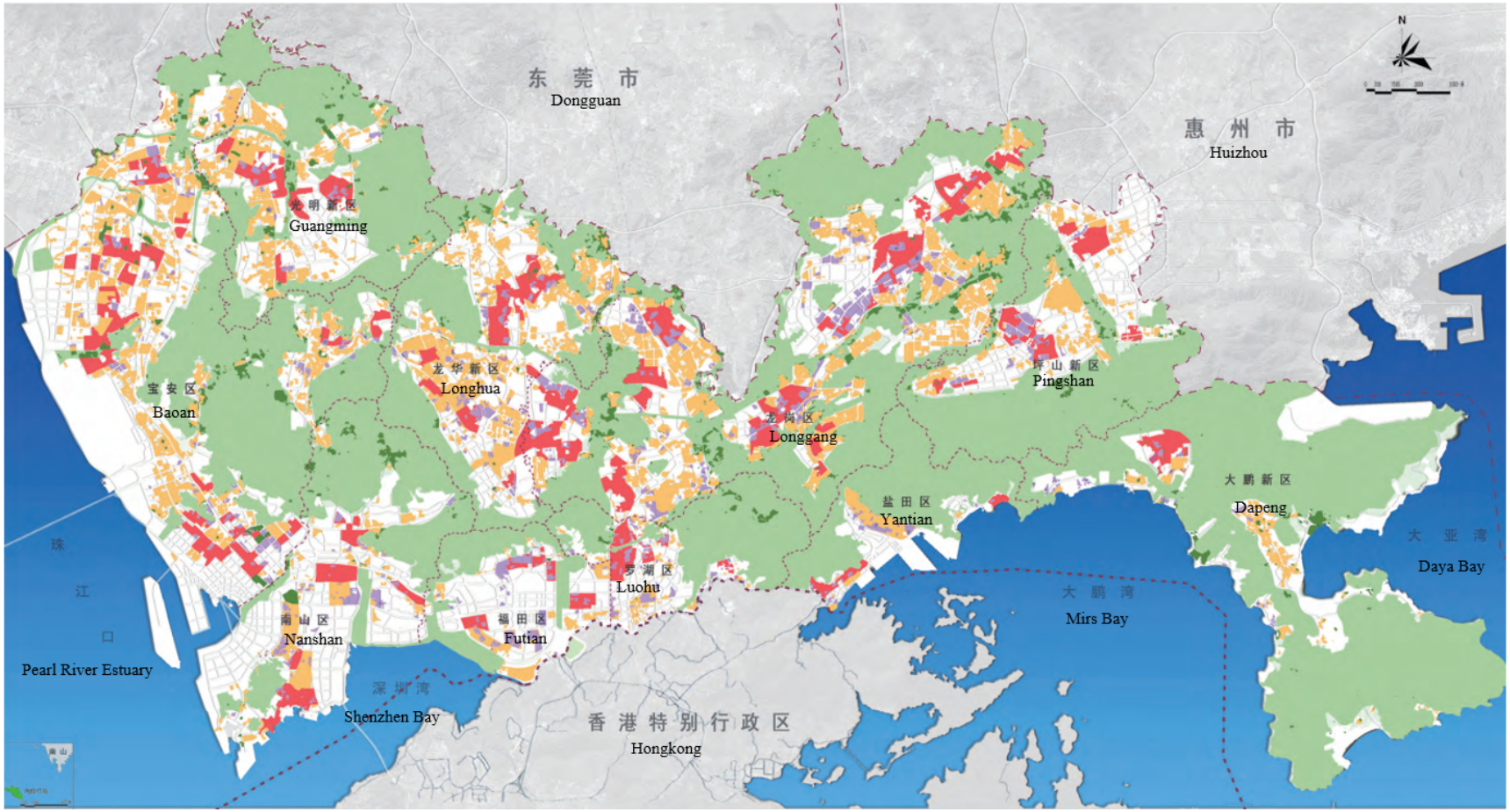


Geographical Distribution of Complexes in Shenzhen



- Light purple dots – Unmatched FPR complexes;
- Darker purple dots – Matched FPR complexes;
- Dark blue dots – LPR complexes.

Geographical Distribution of Zoning Codes



- Red – priority demolition zones; Yellow – demolition or improvement zones; Dark green – restricted or no-demolition zones; Purple – previous demolition zone; Light green – ecological control zones.

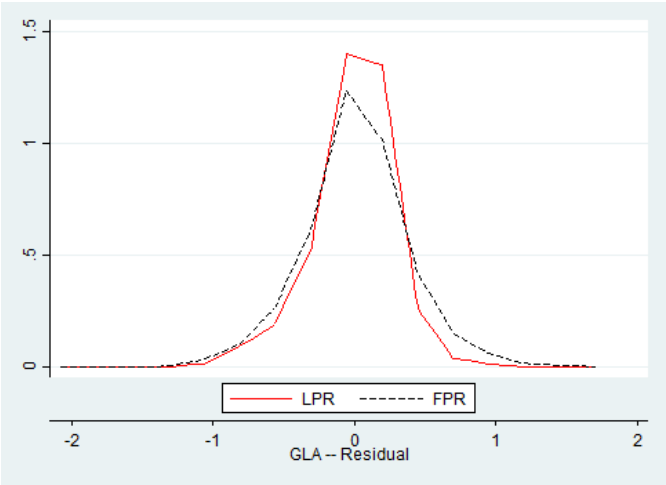
Summary Statistics

Panel A: Listing Data

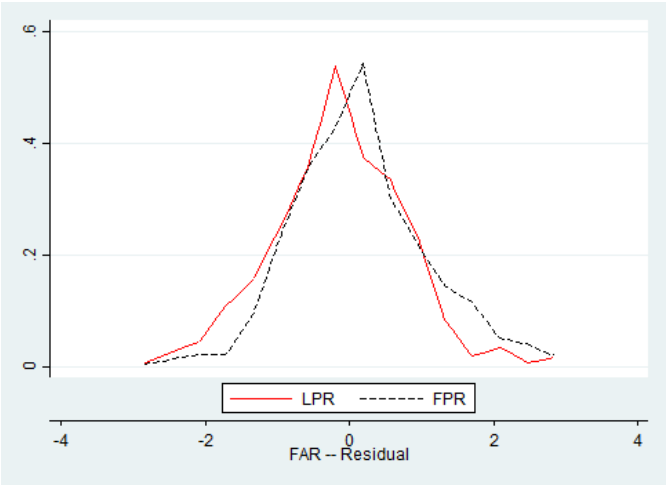
	All		FPR		LPR		
	mean	sd	mean	sd	mean	sd	Difference
Unit Characteristics							
Unit Price (per sq. meter)	19,411	17,169	30,623	17,610	8,958	7,350	-21,665
Bedrooms	2.76	0.98	2.89	1.16	2.64	0.753	-0.25
Living rooms	1.89	0.427	1.88	.49	1.9	0.358	0.02
Bathrooms	1.4	0.622	1.42	.7	1.39	0.538	-0.03
Floor Area	128	3166	157	4,210	100	1685	-57.00
Elevator	0.887	0.316	0.813	.39	0.956	0.204	0.14
Quality of Construction							
Missing	0.08	0.27	0.10	.306	0.05	0.22	-0.05
Original	0.04	0.19	0.05	.219	0.03	0.16	-0.02
Simple Renovation	0.16	0.37	0.15	.36	0.17	0.38	0.02
Average Renovation	0.67	0.47	0.62	.486	0.71	0.45	0.09
Premium Renovation	0.06	0.23	0.07	.26	0.04	0.19	-0.03
Community Characteristics							
FAR	2.90	1.36	3.04	1.44	2.77	1.25	-0.27
GreenRatio	32.40	11.30	36.80	10.8	28.20	10.20	-8.60
HOAFee	1.86	1.17	2.41	1.13	1.34	0.95	-1.07
LotSize	41,501	54,307	43,944	46,079	37,598	65,149	-6,346
TotalArea	112,445	184,373	126,510	221,192	94,406	119432	-32,104
NoUnits	902.00	898.00	835.00	779	968.00	998.00	133.00
NoBuilding	12.70	23.90	14.30	28.8	11.00	17.30	-3.30
PropertyAge	10.10	5.44	10.60	5.57	9.56	5.27	-1.04
UnitRent	41.50	18.60	47.30	19.7	36.10	15.70	-11.20
Turnover	0.065	0.212	0.052	0.112	0.108	0.376	0.06
Price Volatility	1073	1081	1011	964	1236	1327	225.00

Distribution of Residuals

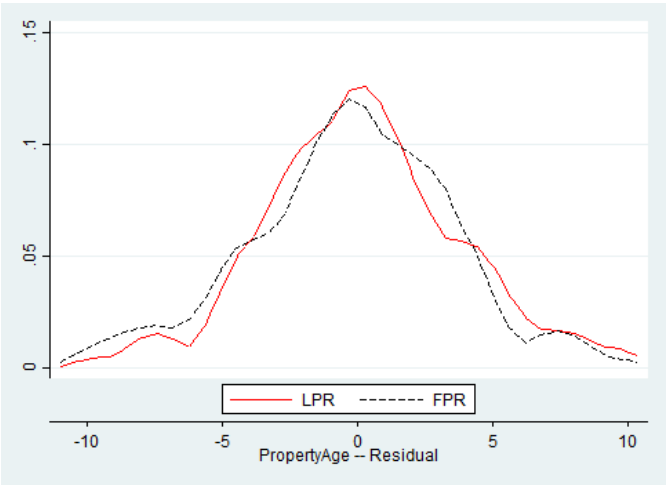
(a) Unit Floor Area



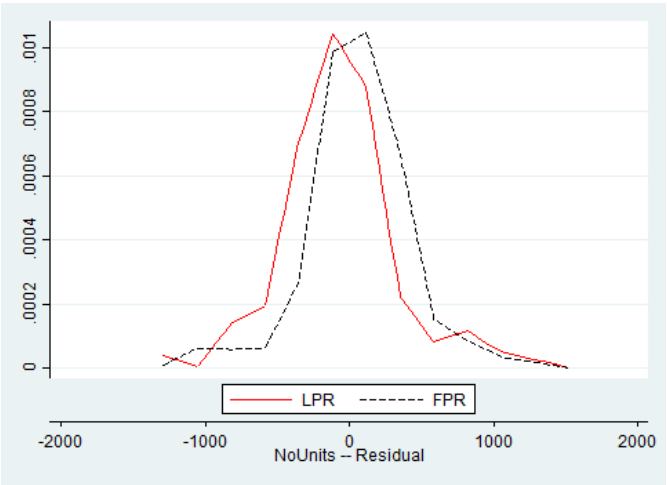
(b) Community FAR



(c) Community Age



(d) Community No. of Units



A Simple Model of Dual Property Rights

- Cash/service flows over the holding period:

Year	$t = A_F$	$t+1$	...	$t+(70-A_F)$	$t+(70-A_F)+1$	...
FPR:	1	1	...	1	γ	...
LPR:	1	γ	...	γ	γ	...

- The resulting prices are

$$P_F = 1 + \sum_{t=1}^{70-A_F} \frac{1}{(1+r)^t} + \sum_{t=70-A_F+1}^{\infty} \frac{\gamma}{(1+r)^t}$$

$$P_L = 1 + \sum_{t=1}^{70-A_F} \frac{\gamma}{(1+r)^t} + \sum_{t=70-A_F+1}^{\infty} \frac{\gamma}{(1+r)^t}$$

A Simple Model

- The relative price of LPR in continuous time is:

$$\ln P_L - \ln P_F \approx -\frac{1-\gamma}{\gamma} \cdot r \cdot (70 - A_F)$$

Empirical Methodology

- Each LPR complex has a FPR counterpart matched based on nearest neighbor logic, forming a pair of complexes (group) j, which is an important location control in our analysis.
- We define the LPR indicator for all properties in our sample based on the complex in which the unit is located.
- $(70 - Age_c)$ measure the remaining leasehold; $[LPR_c \times (70 - Age_c)]$ captures the differential cash flow of LPR relative to FPR over the remaining term.
- While listing price is available at individual unit level, rents are only available at community level each month.

Empirical Methodology

- Formally, the main specification to study the relative price effect is the following:

$$log(P_{i,t}) = \alpha + \beta_1 \times [LPR_c \times (70 - Age_c)] + \gamma \times X_{i,t} + \delta \times Y_{c,t} + \theta_{j,t} + \varepsilon_{i,t}, \quad (1)$$

- We include Group $\times$ month fixed effects.
- $Y_{c,t}$ includes controls of community characteristics such as the community green area ratio and community property management fees. $X_{i,t}$ is a full set of unit characteristics.
- We cluster the standard errors at the group and quarter levels.

Empirical Methodology

- The main specification to study the effect of government policy is the following:

$$\begin{aligned} log(P_{i,t}) &= \alpha + \beta_1 \times [LPR_c \times (70 - Age_c)] + \\ &\beta_2 \times ([LPR_c \times (70 - Age_c)] \times Post_t) \\ &+\gamma \times X_{i,t} + \delta \times Y_{c,t} + \theta_{j,t} + \varepsilon_{i,t}, \end{aligned} \tag{2}$$

- The Post dummy is purposely capturing months after the event on November 9, 2016.
- We include Group $\times$ month fixed effects.
- $Y_{c,t}$ includes controls of community characteristics such as the community green area ratio and community property management fees. $X_{i,t}$ is a full set of unit characteristics.
- We cluster the standard errors at the group and quarter levels.

Relative Price of Property Rights

Panel A: Asking Price

	(1)	(2)	(3)	(4)
	Log(Unit Price) x 100			
LPR × *RemainingLeasehold*	-1.660***	-1.869***	-1.818***	-1.898***
	(-56.22)	(-64.40)	(-50.18)	(-45.35)
Unit Attributes	Yes	Yes	Yes	Yes
Community Attributes	Yes	Yes	Yes	Yes
Unit Rent	No	No	Yes	Yes
Fixed Effects	YM	*Group* × *YM*	*Group* × *YM*	*Group* × *YM*
Observations	537,502	537,502	537,502	384,650
Adjusted R^2	0.505	0.628	0.660	0.653

Panel B: Asking Rent

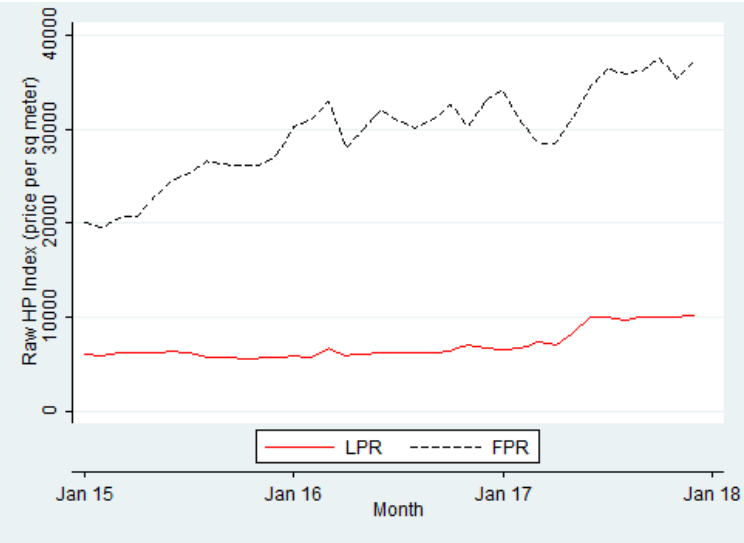
	(1)	(2)	(3)	(4)
	Log(Unit Rent)			
LPR × *RemainingLeasehold*	-0.214***	-0.085	0.055	0.022
	(-5.03)	(-1.59)	(0.75)	(0.35)
Unit Attributes	Yes	Yes	Yes	Yes
Community Attributes	Yes	Yes	Yes	Yes
Unit Rent	No	No	Yes	Yes
Fixed Effects	YM	*Group* × *YM*	*Group* × *YM*	*Group* × *YM*
Observations	10,799	10,799	10,799	7,362
Adjusted R^2	0.519	0.531	0.534	0.578

Implications

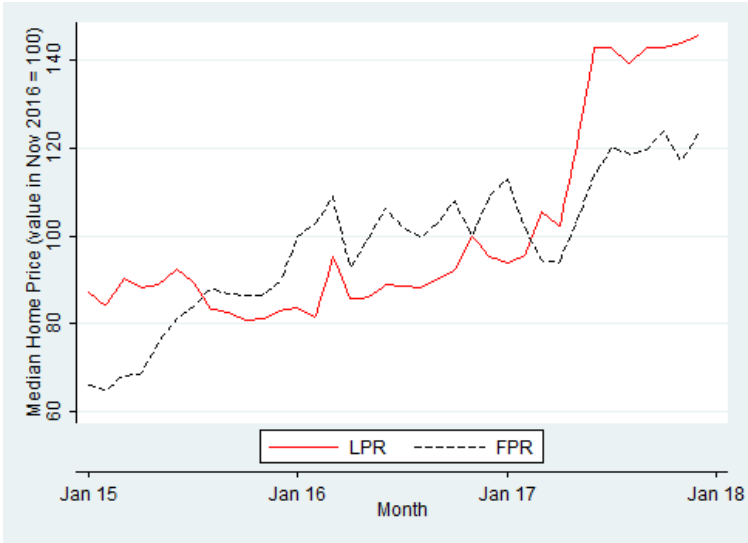
- The estimated relative annual price, β_1 = -1.90 = - $\frac{1-\gamma}{\gamma} \cdot r$.
- Assume households discount future cash flow at the same rate of inflation, *i.e.*, r = 3%, we can derive $\gamma = 0.61$.
- For a 5% discount date, the implied γ would be 0.72.
- The estimated cash and service flow of the LPR are thus estimated have a 30-40 percent discount relative to comparable FPR, depending on the household discount rate.
- This can be due to a number of factors: market liquidity, lack of collateralization opportunities in borrowing, contractual frictions, and uncertainty associated with the lack of mandatory compensation in the case of involuntary demolition.

Parallel Home Price Trends

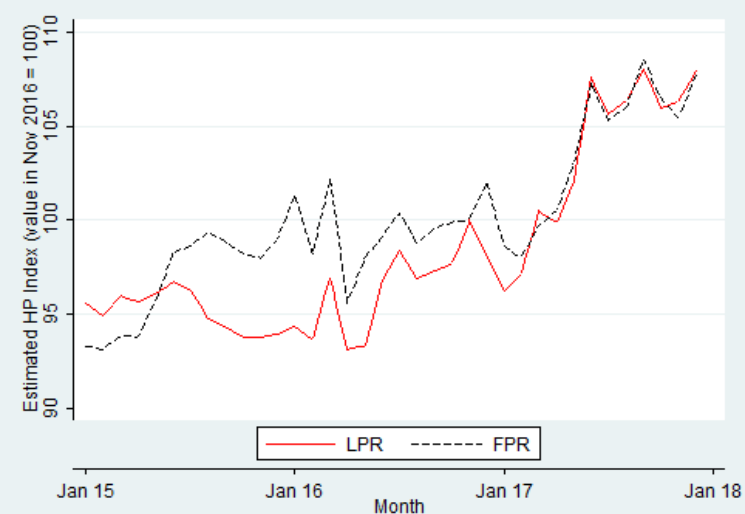
(a) Raw Median Home Prices



(b) Indexed Median Prices



(c) Estimated Home Price Indexes



Effect of Government Regulation

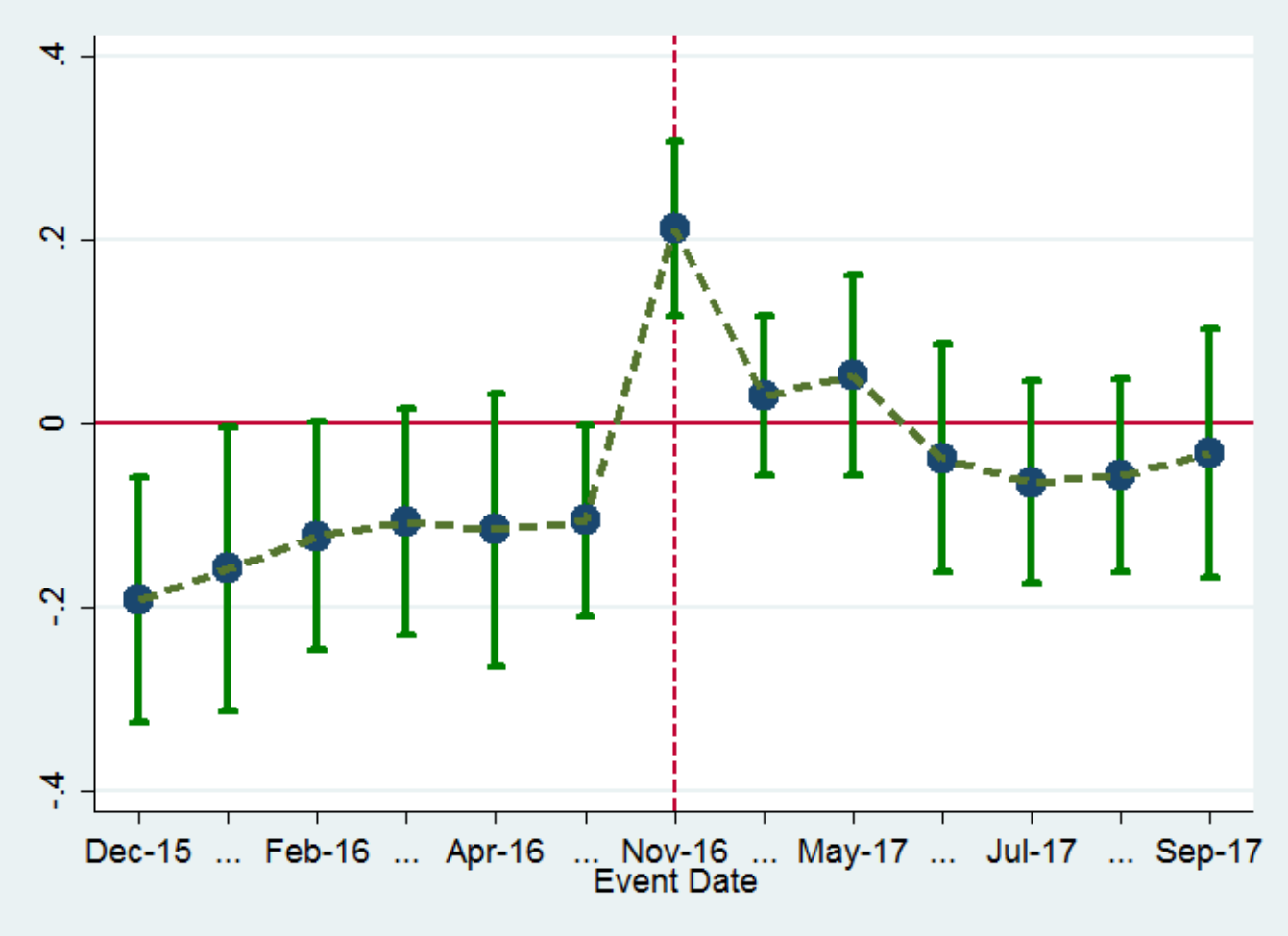
Panel A: Listing Price

	(1)	(2)	(3)	(4)
	Log(Unit Price) x 100			
LPR × *RemainingLeasehold*	-1.714***	-1.981***	-2.030***	-1.998***
	(-37.38)	(-53.13)	(-48.79)	(-40.05)
× *Post*	0.097*	0.121***	0.189***	0.188***
	(1.81)	(3.98)	(4.18)	(4.13)
Unit Attributes	Yes	Yes	Yes	Yes
Community Attributes	Yes	Yes	Yes	Yes
Unit Rent	No	No	No	Yes
Fixed Effects	YM	*Group*|*YM*	*Group* × *YM*	*Group* × *YM*
Observations	384,650	384,650	384,650	384,650
Adjusted R^2	0.513	0.627	0.654	0.654

Panel B: Asking Rent

	(1)	(2)	(3)
	Log(Unit Rent)		
LPR × *RemainingLeasehold*	-0.233***	-0.111**	0.026
	(-5.66)	(-2.38)	(0.39)
× *Post*	0.015	0.010	-0.007
	(0.61)	(0.40)	(-0.27)
Unit Attributes	Yes	Yes	Yes
Community Attributes	Yes	Yes	Yes
Fixed Effects	YM	*Group*|*YM*	*Group* × *YM*
Observations	7,362	7,362	7,362

Falsification



Heterogeneity

Panel A: By Unit Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	Unit Floor Area			Unit Bedrooms		
	Low	Medium	High	1	2	¿=3
LPR × *RemainingLeasehold*	-2.015***	-1.977***	-1.834***	-1.629***	-1.998***	-1.977***
	(-35.52)	(-38.54)	(-26.99)	(-14.29)	(-39.34)	(-38.15)
×*Post*	5.774*	8.322***	13.192***	-0.968	7.750***	9.782***
	(1.90)	(2.81)	(3.16)	(-0.15)	(2.67)	(3.26)
Observations	137,392	133,480	112,302	22,922	120,838	239,119
Adjusted R^2	0.701	0.623	0.669	0.693	0.672	0.656

Panel B: By Community Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	Community Rent Level			Distance to CBD		
	Low	Medium	High	Close	Medium	Far
LPR × *RemainingLeasehold*	-1.666***	-2.107***	-2.197***	-1.913***	-1.997***	-1.880***
	(-22.27)	(-24.60)	(-28.79)	(-24.79)	(-29.83)	(-24.49)
×*Post*	-0.412	14.871***	10.467***	8.409**	17.763***	3.687
	(-0.09)	(3.24)	(2.70)	(2.05)	(4.23)	(0.70)
Observations	124,513	132,905	124,048	126,164	131,659	126,823
Adjusted R^2	0.589	0.602	0.666	0.670	0.696	0.570

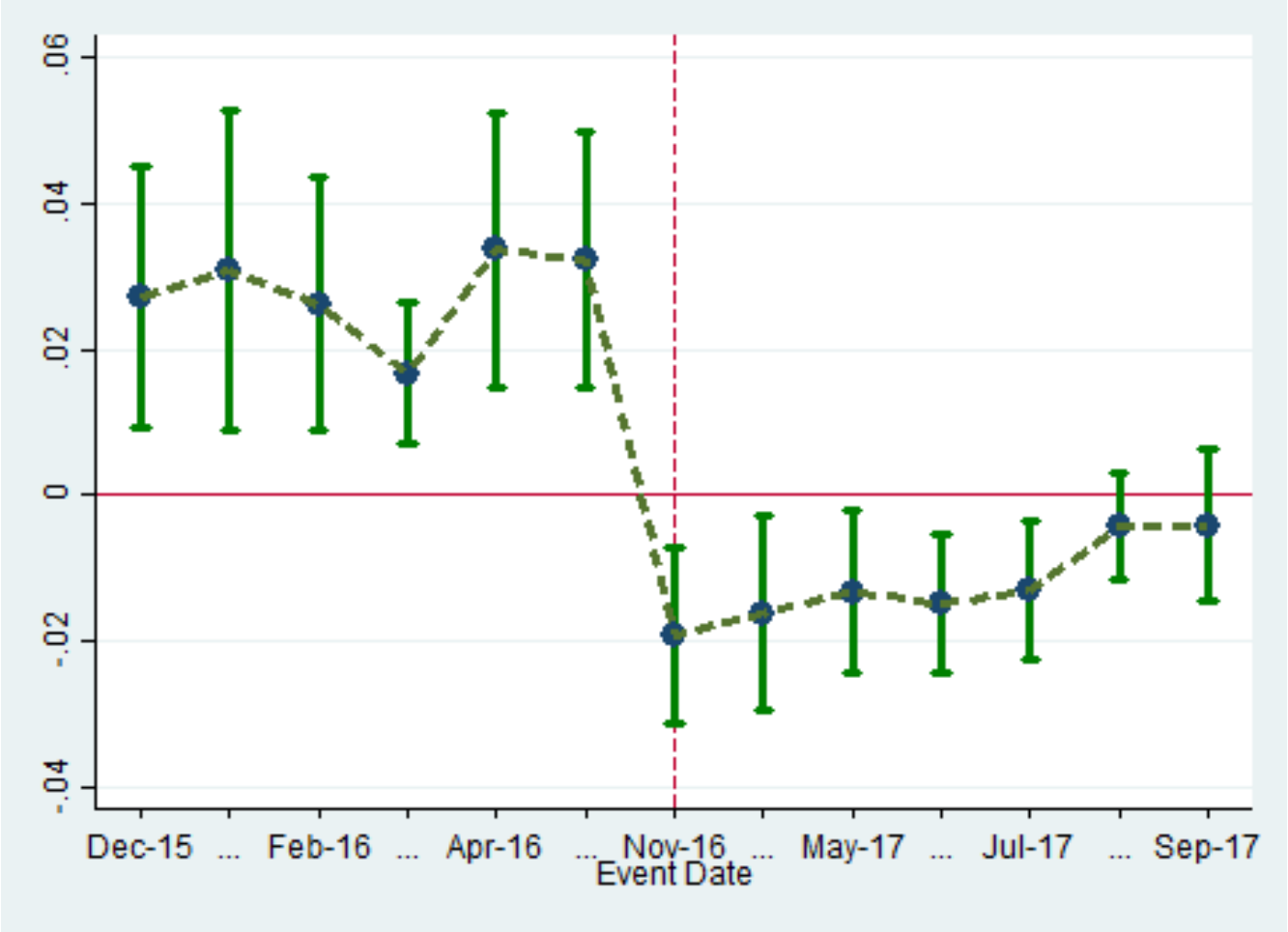
Different Zoning Codes

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Unit Price) x 100					
	New Zoning Code					
	No Change	Prioritized Demolition	Previous Demolition	Demolition OR Improvement	No Demolition	All
LPR × *RemainingLeasehold* ×*Post*	0.023	0.218***	0.222**	0.121***	0.110	-0.139*
	(0.37)	(2.80)	(2.43)	(2.88)	(1.15)	(-1.86)
×*PrioritizedDemolition*						0.372***
						(3.23)
×*PreviousDemolition*						-0.029
						(-0.20)
×*DemolitionImprovement*						0.162*
						(1.88)
×*NoDemolition*						0.235
						(1.32)
LPR × *RemainingLeasehold*	-2.052***	-1.863***	-2.162***	-1.947***	-2.093***	-1.661***
	(-24.01)	(-25.40)	(-21.65)	(-29.70)	(-14.39)	(-29.45)
Observations	80,668	73,303	32,805	115,067	34,272	336,115
Adjusted R^2	0.615	0.595	0.676	0.667	0.599	0.574

Dynamics of Market Activities

	(1)	(2)	(3)	(4)	(5)	(6)
	Turnover Rate			Price Volatility		
LPR × *RemainingLeasehold*	6.410***	6.967***	3.476***	262.210***	331.334***	338.017***
	(7.32)	(10.17)	(3.16)	(6.19)	(11.88)	(8.61)
× *Post*	-1.518	-1.820**	-2.066***	-70.562	-73.655**	-61.916**
	(-1.25)	(-2.21)	(-2.98)	(-1.22)	(-2.27)	(-1.99)
Community Attributes	No	No	Yes	No	No	Yes
Fixed Effects	YM	*Group* × *YM*	*Group* × *YM*	YM	*Group* × *YM*	*Group* × *YM*
Observations	6,321	6,321	6,321	6,836	6,836	6,836
Adjusted R^2	0.018	0.568	0.703	0.007	0.695	0.720

Dynamics of Relative Market Turnover



Conclusion

- Our findings suggest that a significant fraction of the price variations of residential properties in the Chinese housing market are due to variations in property rights.
- Uncertainty associated with property rights protection leads to significantly more speculative activities in the market.
  - We are in the process of modeling how uncertainty on property rights protection, and heterogeneity beliefs in the uncertainty among buyers/sellers, can lead to speculation.
- This is the first paper, to the best of our knowledge, that addresses the role of the uncertainty in property rights in the Chinese housing market, on prices and speculative activities.