What happens when a rural construction land market legally opens to urban developers in China? A spatiotemporal analysis of Nanhai District between 2010 and 2015

Lanjiao Wen, AnLu Zhang

Huazhong Agricultural University, Wuhan, P.R. China

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Outline

- **Introduction**
- **Research questions**
- **Study areas and data**
- **Methods**
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- **Conclusion and Discussion**

INTRODUCTION

- **China has witnessed a flexural development of land market since reform and opening up.**

- **Dualistic structure of the land system——all urban lands are owned by the state(guoyou) and all rural lands are owned by the collective (jiti).**

- **China's land market opened in 1987 when Shenzhen began to implement the paid utilization system for urban land, while the rural lands are always denied by the government and can not enter the market directly.**
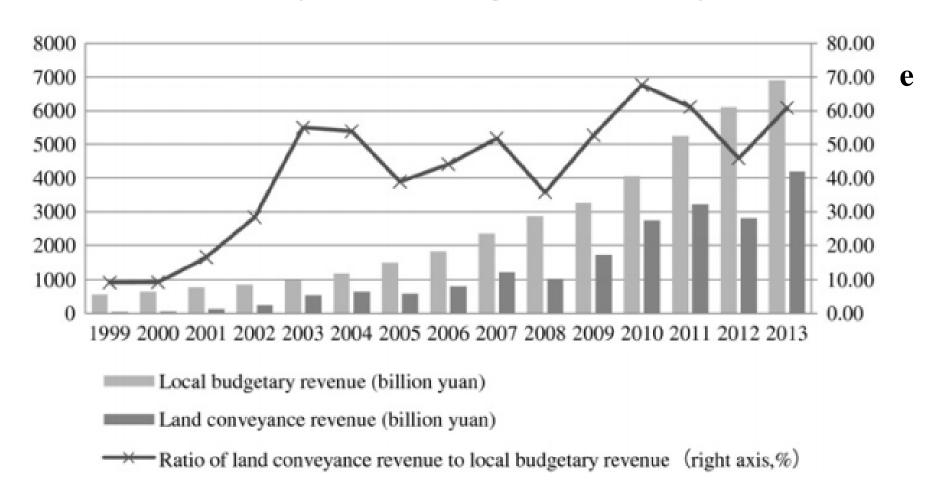
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INTRODUCTION

- **The absence of a rural land market has resulted in inefficient land allocation practices and substantive value capture when rural lands convert to urban uses.**

- **The development of urban land market shifting from planed economy to marketing economy has attracted a massive movement of capital and labors, which caused an increasing demand of construction land and abandon of rural construction land.**

INTRODUCTION

Local budgetary revenue (billion yuan)

Land conveyance revenue (billion yuan)

Ratio of land conveyance revenue to local budgetary revenue （right axis,%）

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INTRODUCTION

- **Improving the efficiency of land markets and narrowing this value gap is of increasing interest among governments, scholars and farmers in China.**

- **In 2005, Guangdong provincial government established a management plan that outlined the rights of rural land use conversions, which stated that rural development lands may enter the land market in the form of leases.**

- **In 2010, the government of Nanhai district began to regulate the transaction of rural collective assets—the first time rural land entered the market in China.**
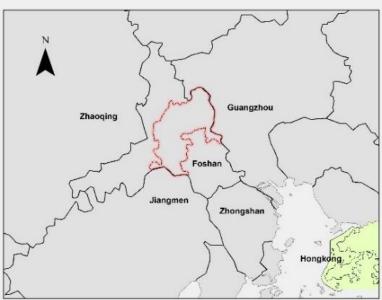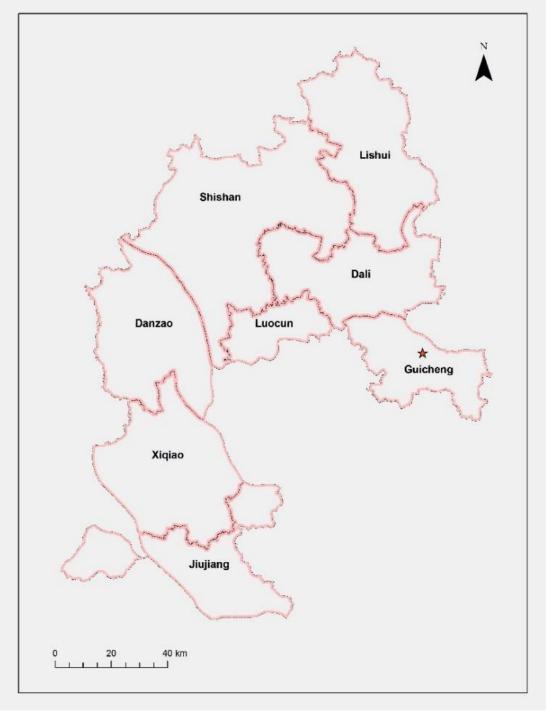
QUESTIONS

- **What happens when rural construction land market legally opens to urban developers?**

- **What is the spatiotemporal heterogeneity of newly rural-urban construction land market since 2010?**

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STUDY AREAS AND DATA

- ## Data processing

- **The lease period of rural land is much shorter than that of urban land. For comparison of rural and urban markets, Income Capitalization Approach (ICA, model 1) is used to convert the rent of rural construction land lease to land price.**

$$P_i = \frac{R_i}{r_i}\left[1 - \frac{1}{(1+r)^n}\right] \quad \text{(Model 1)}$$

Year	Urban			Rural		
	Quantity	Mean plot size	Mean price	Quantity	Mean plot size	Mean price
2010	131	511.22	3,966.41	314	27.46	650.52
2011	77	205.40	4,055.78	697	101.20	982.58
2012	64	80.54	3,633.23	340	188.21	2,021.38
2013	91	380.44	7,321.59	243	94.78	4,037.01
2014	34	157.14	2,200.14	149	66.40	1,917.74
2015	18	52.49	13,744.98	52	30.04	5,143.21

METHODS

- **Mapping price over time with GIS**

- **In order to map the changes in land prices, we converted text-based transaction records on spatial location to actual spatial locations via GIS for 2,285 points. Then a spatial interpolation method, Inverse Distance Weighting (IDW), is used to calculate the interpolation value using a weighted average (model 2).**

$$z = \left[\sum_{i=1}^{n} \frac{z_i}{d_i^2} \right] \bigg/ \left[\sum_{i=1}^{n} \frac{1}{d_i^2} \right] \qquad \text{(Model 2)}$$

Where $d_i^2 = (X - X_i)^2 + (Y - Y_i)^2$ and Z equals land price (P).
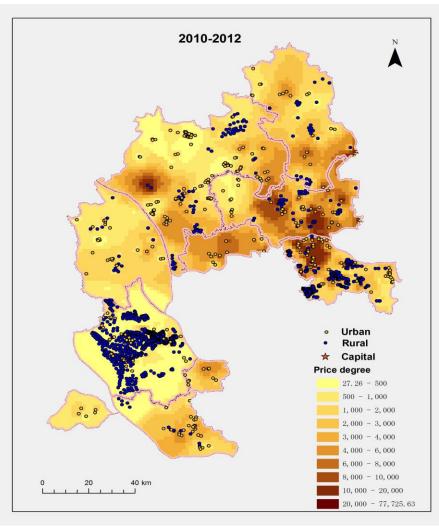
METHODS

■ **Estimating the hedonic price model**

Category	Name	Description	Mean/Frequency
Structure	*size*	Total area of parcel (m²)	10773.44
	type	The land use type is categorical variable, 1 = *industrial*, 2 = *commercial*, 3 = *residential*, 4 = *other*	1 (73.26%), 2 (17.2%), 3 (8.36%), 4 (1.18%)
	rural	Property type: 1 = *rural*, 0 = *other*	1 (78.56%), 0 (21.44%)
Location	*distCenter*	Distance from each parcel to the capital (m)	17186.97
	distRoad	Distance from parcel to nearest road (m)	169.98
	distRiver	Distance from parcel to Pearl River (m)	368.74
Neighborhood	*density*	Population density town (pop/km²)	1557.55
	perGDP	Per capital GDP of town (10,000 yuan/person)	15.20
Environment	*invest*	Fixed-asset investment of town in (100 million yuan)	102.22
	industry	Gross industrial production of town (100 million yuan)	589.26
Time	*year*	2010-2015 (categorical)	2010 (19.43%), 2011 (33.92%), 2012 (21.05%), 2013 (14.62%), 2014 (7.96%), 2015 (3.02%)

N = 2285

RESULTS

■ **Spatiotemporal pr**
  development land

Spatial:
(1)prices in northern Nanhai
were considerably higher
than that in the south；
(2)the number of rural
parcels sold was greater
than that of urban use;
(3) rural lands were
primarily located in Xiqiao
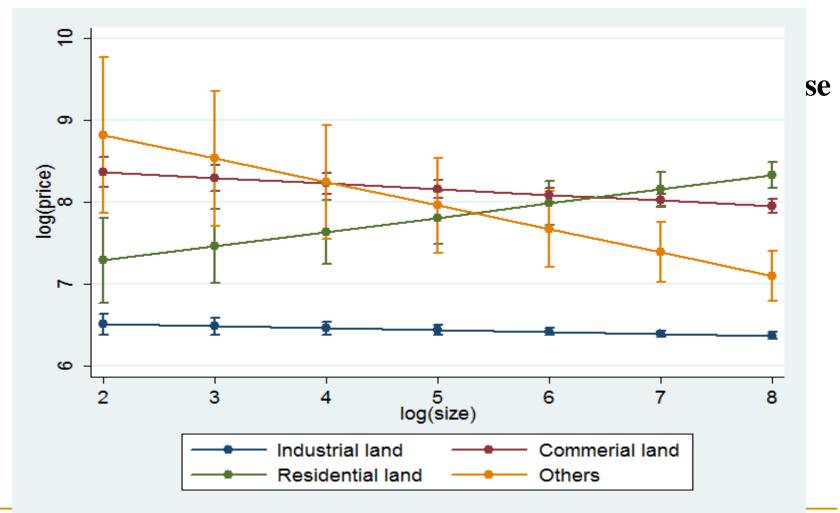**and Guicheng .**

2010-2015

N

Urban
Rural
Capital
Price degree
27.26 - 500
500 - 1,000
1,000 - 2,000
2,000 - 3,000
3,000 - 4,000
4,000 - 6,000
6,000 - 8,000
8,000 - 10,000
10,000 - 20,000
20,000 - 111,219.44

0   20   40 km

RESULTS

■ *Hedonic model results*

	Model 5					Model 6				
Variable	B	SE	t	P	ME	B	SE	t	P	ME
Size	-0.026	0.010	-2.490	0.013	-0.026	-0.023	0.013	-1.76	0.079	-
Distance	-0.398	0.022	-18.23	0.000	-0.398	-0.395	0.022	-18.21	0.000	-0.395
distRoad	-0.142	0.018	-7.95	0.000	-0.142	-0.142	0.018	-8.05	0.000	-0.142
perGDP	1.042	0.154	6.78	0.000	1.042	1.008	0.153	6.57	0.000	1.008
Industry	-0.231	0.072	-3.19	0.001	-0.231	-0.222	0.072	-3.09	0.002	-0.222
Rural	-0.190	0.060	-3.14	0.002	-0.173	-0.212	0.06	-3.54	0.000	-0.191
Type										
commercial	1.066	0.048	22.37	0.000	1.905	1.412	0.152	9.31	0.000	3.105
residential	1.873	0.074	25.24	0.000	5.507	-0.081	0.340	-0.24	0.812	-
Other	0.140	0.155	0.900	0.368		2.411	0.626	3.85	0.000	10.142
type*log(size)										
commercial	-	-	-	-	-	-0.047	0.020	-2.350	0.019	-0.045
residential	-	-	-	-	-	0.197	0.035	5.700	0.000	0.217
Other	-	-	-	-	-	-0.264	0.070	-3.75	0.000	-0.232
Year										
2011	0.198	0.048	4.170	0.000	0.219	0.195	0.047	4.140	0.000	0.215
2012	0.278	0.054	5.160	0.000	0.321	0.255	0.054	4.760	0.000	0.291
2013	0.677	0.062	10.88	0.000	0.968	0.632	0.062	10.17	0.000	0.882
2014	0.311	0.075	4.170	0.000	0.365	0.312	0.074	4.230	0.000	0.366
2015	1.126	0.108	10.44	0.000	2.083	1.146	0.107	10.75	0.000	2.147
Constant	9.612	0.247	38.93	0.000	-	9.629	0.244	39.47	0.000	-
R-squared	0.625					0.635				
F	270.36, Prob > F = 0.000					231.55, Prob > F = 0.000				

N=2285, B=regression coefficient, S=standard error, t=t-statistic, P=significance, ME=marginal effects coefficient.

RESULTS

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CONCLUSION AND DISCUSSION

- **Conclusions**

- First, from the spatial-temporal changes of land price, rural and urban construction land increased during our study period. Indeed, the price gradient between North and South is evident.

- Second, there is a relative stable price difference between the rural and urban construction lands. And property attributes, such as lot size, the distances to center and road, and industrial output have negative effects on the land price, while other characteristics have the opposite.

- Lastly, there exist interaction effects between land use types and lot size (IELULS) on price.

CONCLUSION AND DISCUSSION

- **Discussion**

- We grouped six years into two periods of the three year time scale (2010-2012 and 2013-2015) which is inconsistent with China's national and local five year plan of national economic development.

- We employed district, town and parcel up-down spatial hierarchy scales to identify the developing features of rural-urban construction land market.

- IELULSs among residential, commercial, industrial and other lands we found may be different in ownerships and land development patterns.

- Finally, China's unique two-tiered ownership structure and socialist characteristics, unlike the western free market economies, may play an important role in the price mechanism of rural-urban construction land markets.

Thank you
for your attention!

Email: wenlanjiao@webmail.hzau.edu.cn
Huazhong Agricultural University, Wuhan, P.R. China