

# Government-Directed Urban Growth, Firm Entry, and Industrial Land Prices in Chinese Cities

Jan Brueckner<sup>1</sup>   Wenhua Liu<sup>2</sup>   Wei Xiao<sup>3</sup>   Junfu Zhang<sup>4</sup>

<sup>1</sup>UC Irvine

<sup>2,3</sup>Southwestern University of Finance and Economics

<sup>4</sup>Clark University

May 2024

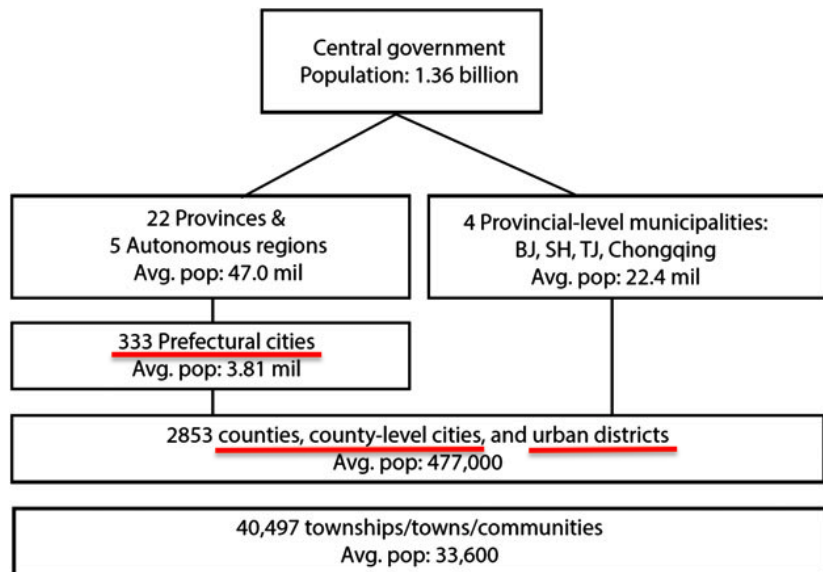
# What's the Role of Government in the Process of Urbanization?

- Obviously an important question
- A vast literature treats government as a way to internalize externalities
  - Urban sprawl as a result of market failures (Brueckner and Fansler 1983; Brueckner 2000, 2001 ...)
  - Urban growth boundaries (Ding et al. 1999; Brueckner 2007; Cunningham 2007; ...)
  - Zoning and density regulations (Crone 1983; Thorsnes 2000; Mills 2005; ...)
  - Development impact fees (Gyourko 1991; Brueckner 1997; Burge and Ihlanfeldt 2006; ...)
- This paper: government to coordinate expectations (similar to the idea of “development guarantee” in Owens et al. 2020)

# What We Do in This Paper

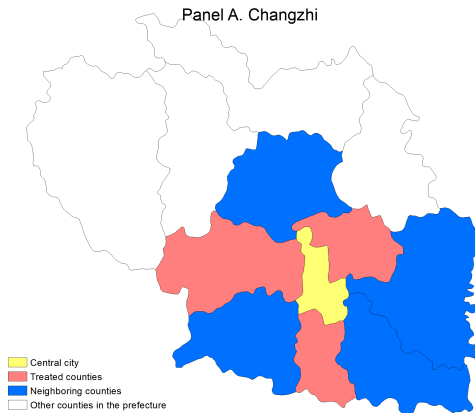
- Document a government practice in China — converting adjacent rural counties into municipal districts
  - Many cases in the past decade
  - This makes it clear in which direction the city will expand, coordinating economic activities
- Show that price of industrial land in newly converted districts increased, using industrial land in neighboring counties as controls
  - Channel: increases in firm entry and investment

# Five Levels of Governments in Mainland China



Source: Wong (2017)

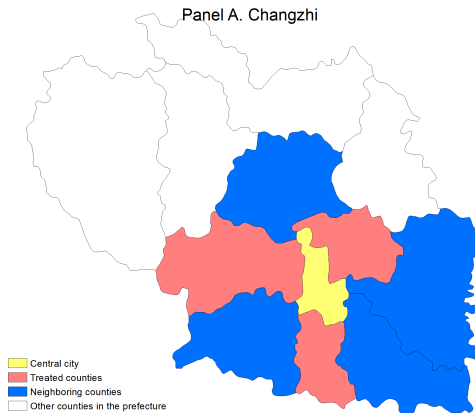
# Converting County into District: An Example



Will refer to this conversion as a directed-urban-growth (DUG) reform

- Yellow area: original central city of the prefecture
- Pink area: counties converted into districts (treated)
  - Blue area: counties adjacent to city but not converted (control)
  - White area: other counties

# Converting a County into a District: An Example



## Counties vs. districts

- At the same administrative level
- Counties: more rural, more agricultural, more autonomy
- Districts: mostly/totally urban, more industrial, less autonomy
- Once converted, urban expansion is coming this way

# A Toy Model to Motivate Empirical Exercise

- Adapted from the option model in Brueckner and Picard (2015)
- Two periods, two counties
  - An entrepreneur makes an irreversible investment in one county (combining some capital with one unit of land)
  - Return in period 2 is uncertain (city may expand in either direction)
  - Option value to wait until the 2nd period to invest
- Annexation of one county in period 1 indicates that future development more likely to happen in this county
- Less option value; invest in the annexed county in period 1
  - Increased firm entry/investment in the annexed county
  - Bid up industrial land price in annexed county

# Data Sources

- Records of county-to-district conversions from the Ministry of Civil Affairs
  - Drop cases before 2008 because land transactions data was incomplete; drop conversions in Tibet, Xinjiang, and direct-control municipalities
  - End up with 97 cases in the period 2010-2019



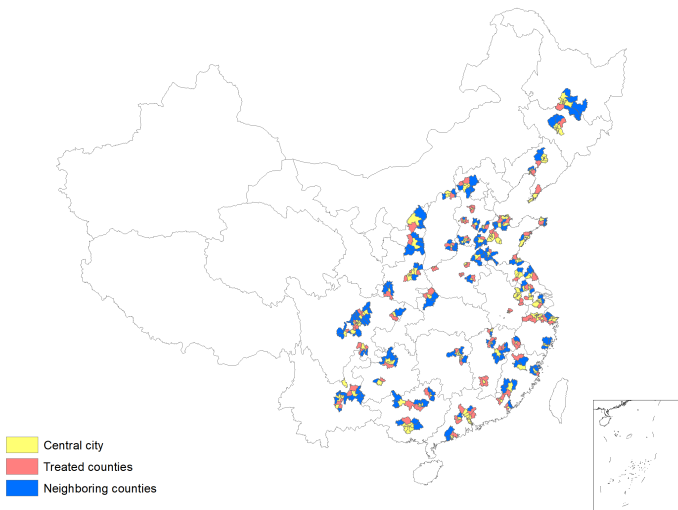
# Data Sources

- Records of county-to-district conversions from the Ministry of Civil Affairs
  - Drop cases before 2008 because land transactions data was incomplete; drop conversions in Tibet, Xinjiang, and direct-control municipalities
  - End up with 97 cases in the period 2010-2019
- Land transaction data collected by crawling the website: [www.landchina.com](http://www.landchina.com)
  - Information on land parcel: area, price, transaction method (auction, negotiation, etc.), leasehold length, land grade, whether the land is newly converted for urban use, level of government that approved the transaction ...

# Data Sources

- Records of county-to-district conversions from the Ministry of Civil Affairs
  - Drop cases before 2008 because land transactions data was incomplete; drop conversions in Tibet, Xinjiang, and direct-control municipalities
  - End up with 97 cases in the period 2010-2019
- Land transaction data collected by crawling the website: [www.landchina.com](http://www.landchina.com)
  - Information on land parcel: area, price, transaction method (auction, negotiation, etc.), leasehold length, land grade, whether the land is newly converted for urban use, level of government that approved the transaction ...
- Data on counties/districts/cities: from yearbooks

# County-to-District Conversions in Analysis ample



# Characteristics of Counties in 2010

Variable	(1) Treatment group	(2) Control group	(3) Difference
Population (100,000)	57.742 (28.593)	60.626 (34.348)	-4.667 (0.197)
Rural population (100,000)	48.629 (24.833)	50.755 (30.200)	-3.782 (0.245)
GDP of the secondary industry (million yuan)	105.800 (106.171)	91.749 (148.099)	3.878 (0.809)
GDP of the tertiary industry (million yuan)	60.054 (64.918)	54.436 (84.908)	0.364 (0.969)
Ratio of county to prefecture GDP	11.800 (10.429)	10.578 (13.705)	0.275 (0.853)
Ratio of county to prefecture revenue	29.049 (35.647)	26.005 (36.584)	3.787 (0.404)
Loan share in GDP	0.507 (0.282)	0.509 (0.270)	-0.014 (0.602)
Number of students (100,000)	0.712 (0.453)	0.736 (0.478)	-0.077 (0.145)
Number of hospital beds per 10000 people	25.048 (10.737)	25.273 (12.782)	1.154 (0.422)
Observations	97	155	252

p-values in parentheses in last column

# Empirical Specification

$$\log Price_{ict} = \alpha + \beta * DUG_{ict} + \psi * X_{ict} + f_c + \delta_{pt} + \epsilon_{ict} \quad (1)$$

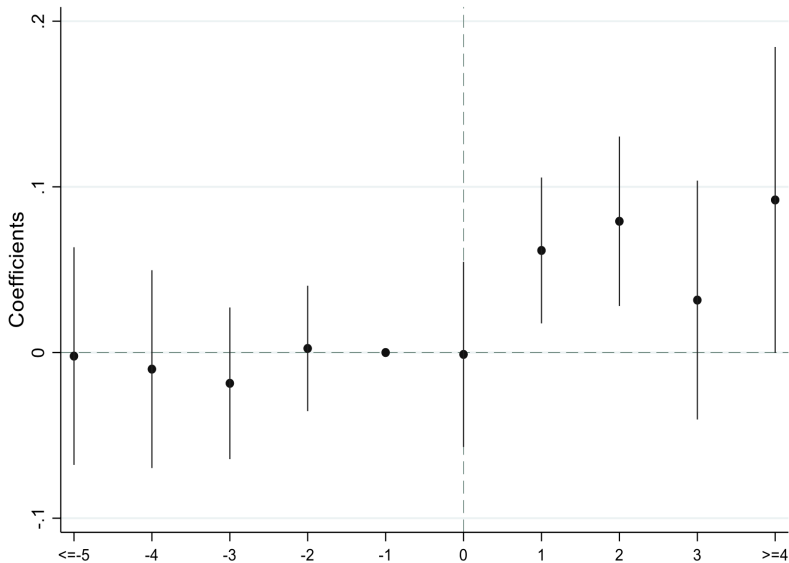
- $Price_{ict}$ : price of industrial land parcel  $i$  in county  $c$  in year  $t$
  - $DUG_{ict} = 1$  if county  $c$  in year  $t$  has been converted to district
  - $X_{ict}$ : land parcel level controls, including transaction mode, land grade, level of the government that approved the transaction, whether it is newly converted for urban use, land area, leasehold length, and distance to the county center
  - $f_c$ : county fixed effect
  - $\delta_{pt}$ : province-year fixed effect
- Estimate this equation with two samples
    - Treated counties only: event study, comparing land price before and after this reform
    - Treated and control counties: DID approach

# Baseline Results

DV: Log industrial land price	(1)	(2)	(3)	(4)
	Event study		DID	
DUG	0.0716**	0.0699***	0.0842***	0.0696***
	(0.0311)	(0.0237)	(0.0298)	(0.0267)
Parcel-level controls	No	Yes	No	Yes
Price_trend	Yes	Yes	Yes	Yes
County_FE	Yes	Yes	Yes	Yes
Province_Year_FE	Yes	Yes	Yes	Yes
Observations	23956	23956	56620	56620
Adjusted $R^2$	0.667	0.711	0.690	0.730

Industrial land price increased by **7%** after county being converted to district

# Dynamic Effects with DID Specification



# Results Robust to Including County Characteristics in 2010

DV: Log industrial land price	(1)	(2)
DUG	0.0839*** (0.0204)	0.0760*** (0.0240)
County characteristics in 2010 × Year dummies	Yes	Yes
Parcel-level controls	Yes	Yes
Price_trend	Yes	Yes
County_FE	Yes	Yes
Province_Year_FE	Yes	Yes
Observations	23955	56618
Adjusted $R^2$	0.715	0.732

County characteristics include population, GDP, the industrial structure (the share of the secondary sector in GDP), and urbanization rate (the share of the non-agricultural population in total population).



# No Effects on Price of Industrial Land in Central City or Control Counties

DV: Log industrial land price	(1) Central city	(2) Neighboring counties
DUG	0.0093 (0.0419)	-0.0183 (0.0325)
Parcel-level controls	Yes	Yes
Price_trend	Yes	Yes
County_FE	Yes	Yes
Province_Year_FE	Yes	Yes
Observations	34999	32664
Adjusted $R^2$	0.403	0.746

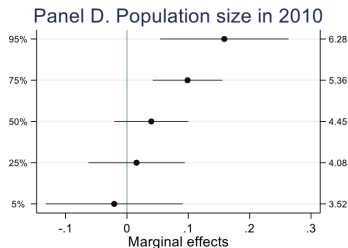
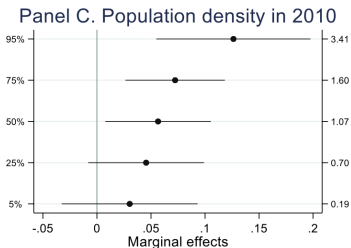
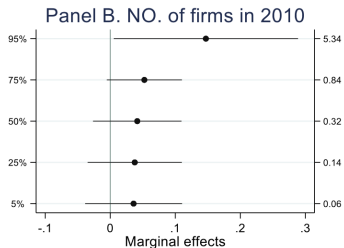
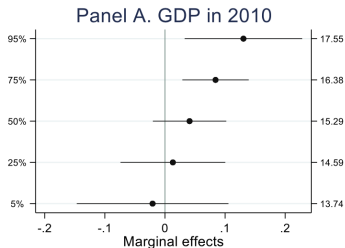
# More Firm Births after County-to-District Conversion

DV: Log no. of newly registered enterprises	(1) Event study: using the sample of treated counties	(2) DID: using neighboring counties as the control group	(3) DID: using central cities as the control group
DUG	0.1248** (0.0552)	0.0622* (0.0326)	0.0711** (0.0343)
Controls	Yes	Yes	Yes
County_FE	Yes	Yes	Yes
Province_Year_FE	Yes	Yes	Yes
Observations	850	2280	1610
Adjusted $R^2$	0.832	0.944	0.974

# More Investment in Fixed Assets after County-to-District Conversion

DV: $\ln(\text{investment})$	(1) Event study	(2) DID
DUG	0.0967* (0.0502)	0.1006*** (0.0387)
Controls	Yes	Yes
County_FE	Yes	Yes
Province_Year_FE	Yes	Yes
Observations	713	1908
Adjusted $R^2$	0.914	0.936

# Heterogeneous Effects by Central City Characteristics



Effect on **industrial land price** is most prominent when central city has larger population, population density, or higher GDP

# Conclusions

- After a county is annexed into the central city of the prefecture, industrial land price increases by 7%
- This is because there are more firm births and investment in fixed assets in the treated county
- The effect is bigger if the central city is larger
- What happened to the price of other types of land? (marginally significant positive effect on residential land price; effect on commercial land price may be negative)