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Global Course on Institutional Design and Spatial Planning

Urban Spatial Transformation in Transitional China:

The Role of Planning

QIN Bo, *Ph.D.*, *Professor*
Department of Urban Planning and Management
School of Public Administration and Policy
Renmin University of China

Email: qinbo@ruc.edu.cn
HP: 13683373538

- **Context: Urbanization in China**
- **Urban spatial structure: theories and models**
- **Chinese cities: pre 1949**
- **Chinese cities: 1949-1978**
- **Chinese cities: post 1978**

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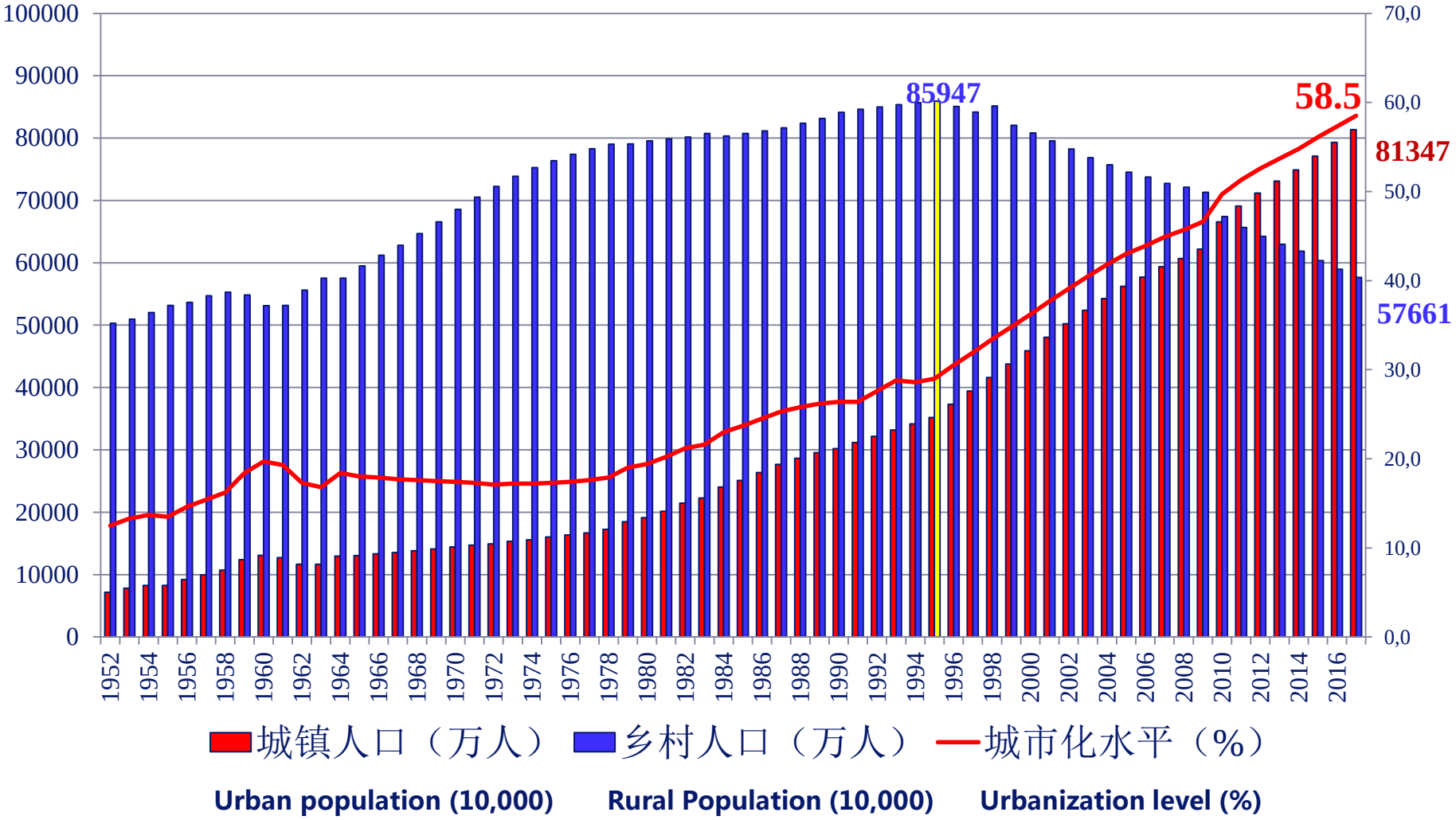
CONTEXT: URBANIZATION IN CHINA



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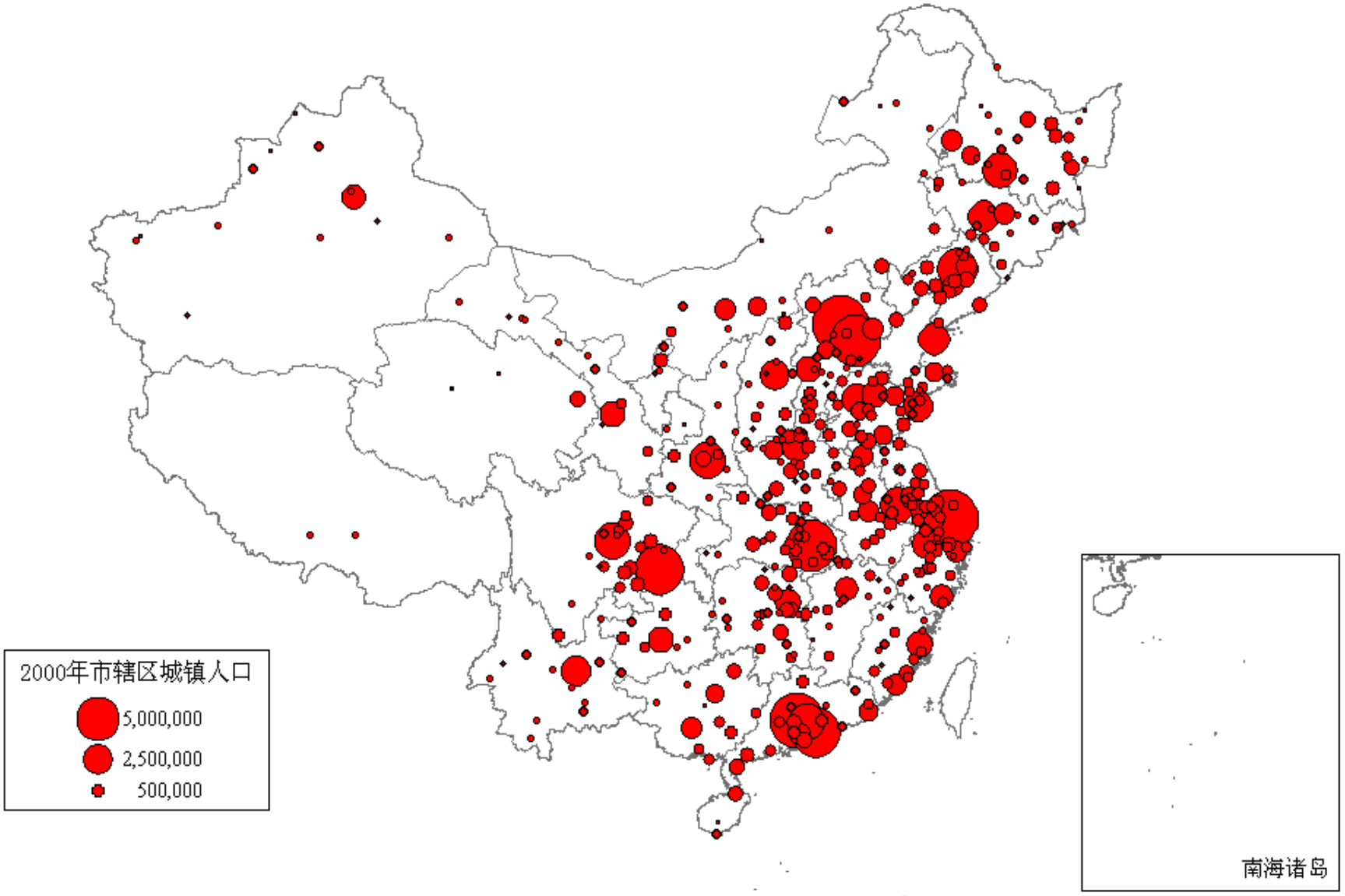
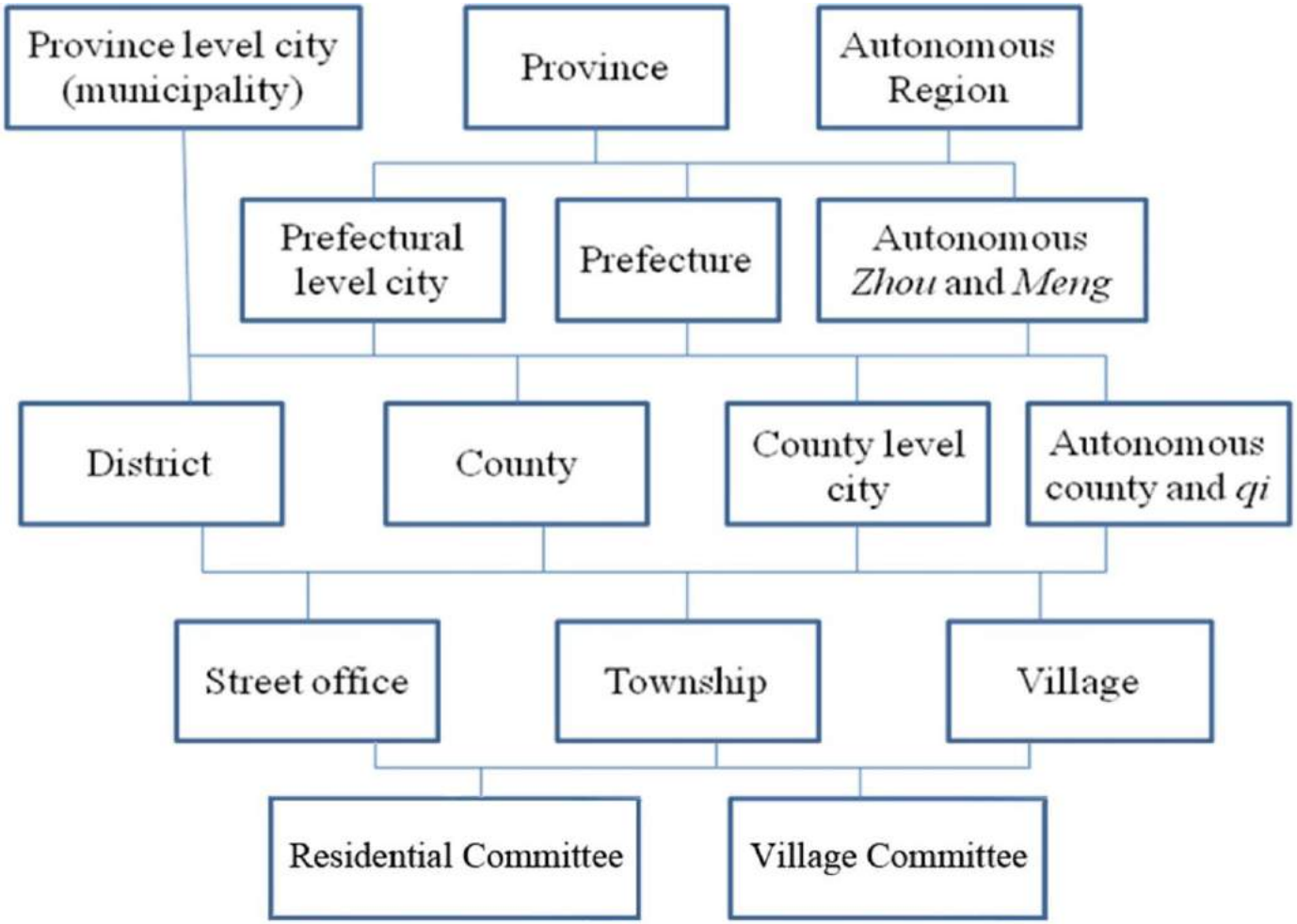
Changes in urban system, 1952, 1978,2000



CONTEXT: URBANIZATION IN CHINA



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URBAN SPATIAL STRUCTURE: THEORIES AND MODELS

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URBAN SPATIAL STRUCTURE

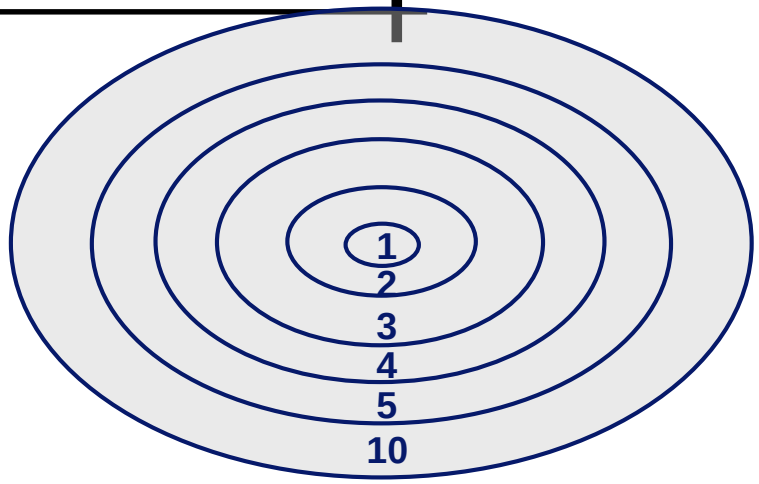
Urbanism as a way of life (Wirth, 1938)

size of the population aggregate; density; heterogeneity

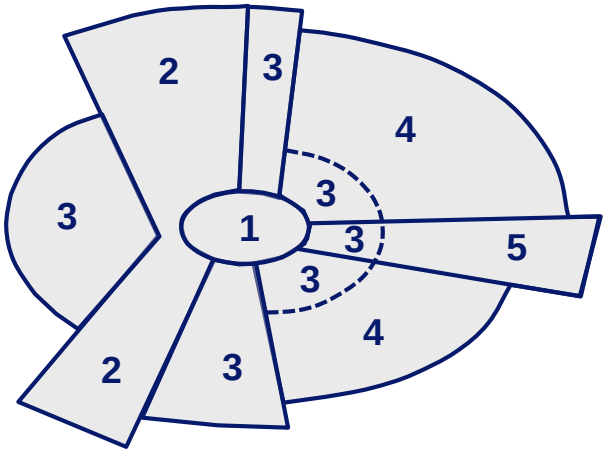
Key Measurements of Urban Spatial Structure

1. **Scale:** Population, land cover extent, urban built-up area…
2. **Density:** Population per unit area of urban land, firm…
3. **Mix**: land use mix, social segregation/inclusion …
4. **Centrality**: CBD, sub-centers, proximity to center…
5. **Fragmentation/Compactness/.....**

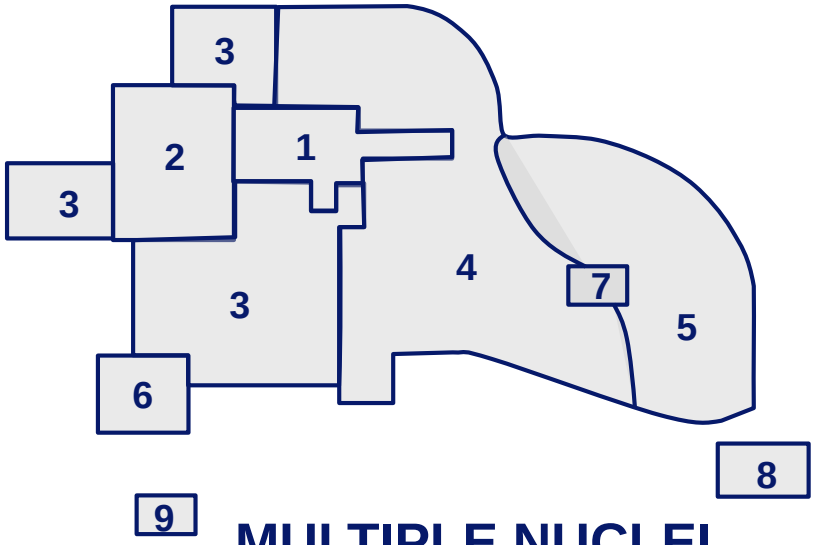
Models of urban structure / urban sociology



CONCENTRIC RING



SECTOR MODEL



MULTIPLE NUCLEI

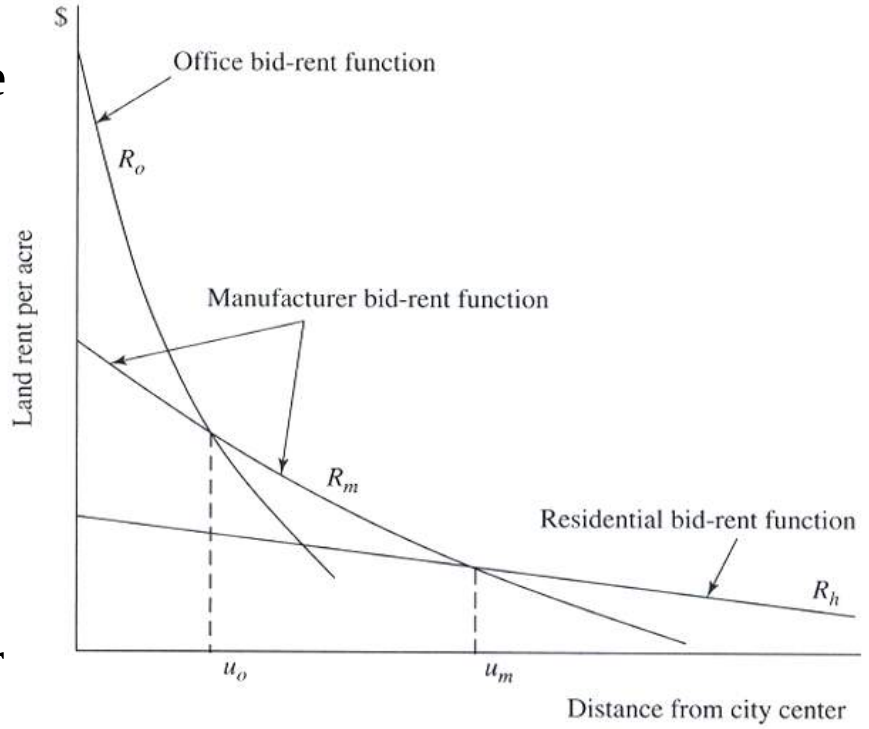
DISTRICT

1. Central Business District
2. Wholesale/Light manufacturing
3. Low-class residential
4. Medium-class residential
5. High-class residential
6. Heavy manufacturing
7. Outlying business district
8. Residential suburb
9. Industrial suburb
10. Commuter zone

Monocentric/polycentric city models / urban economics

Stylized Facts on Urban Spatial Structure

- Housing/land prices decrease with distance from the city center.
- Building heights decrease with the distance.
- Population and employment densities decrease with the distance.



✓ The Monocentric City model (AMM bid-rent model) provides clear explanations for these stylized facts.

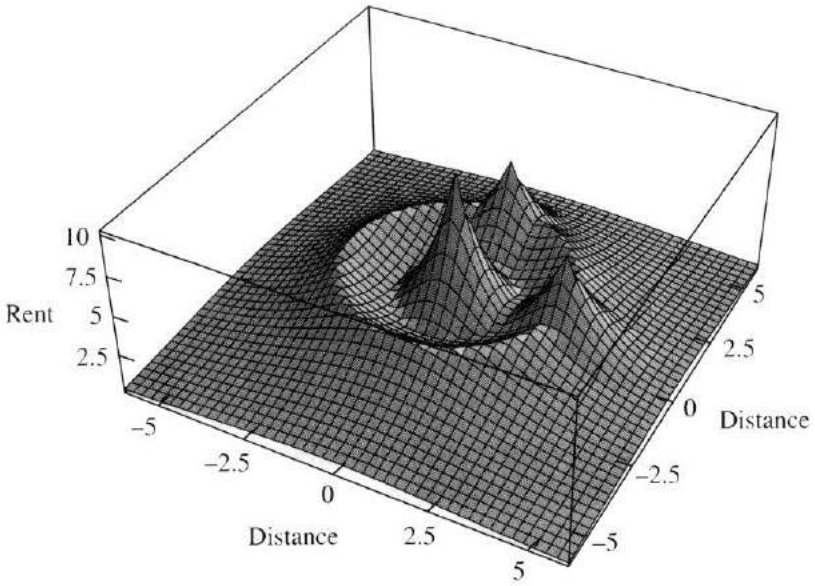
- Poly-centric urban form
  - Suburbanization and sub-urban centers *(McDonald and McMillen, 1998, 2000; Cervero and Wu, 1997)*

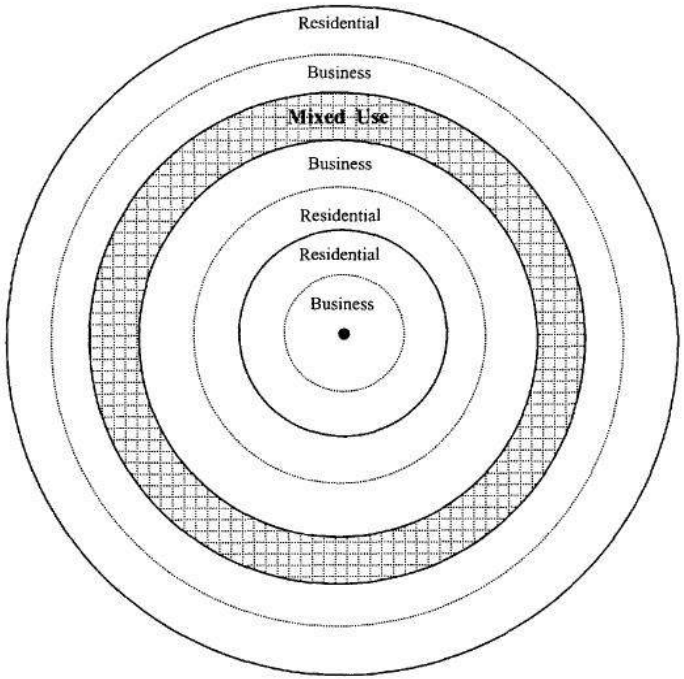
- Agglomeration economies
  - IRS and location externality *(Krugman, 1999)*
  - Lucas' city *(Lucas and Rossi-Hansberg, 2002)*

✓ Agglomeration economies vs. transport cost

- Strong and low
- Strong and high

- Weak and high





Urban models / urban geography

Model of European socialist city

(French and Hamilton, 1979)

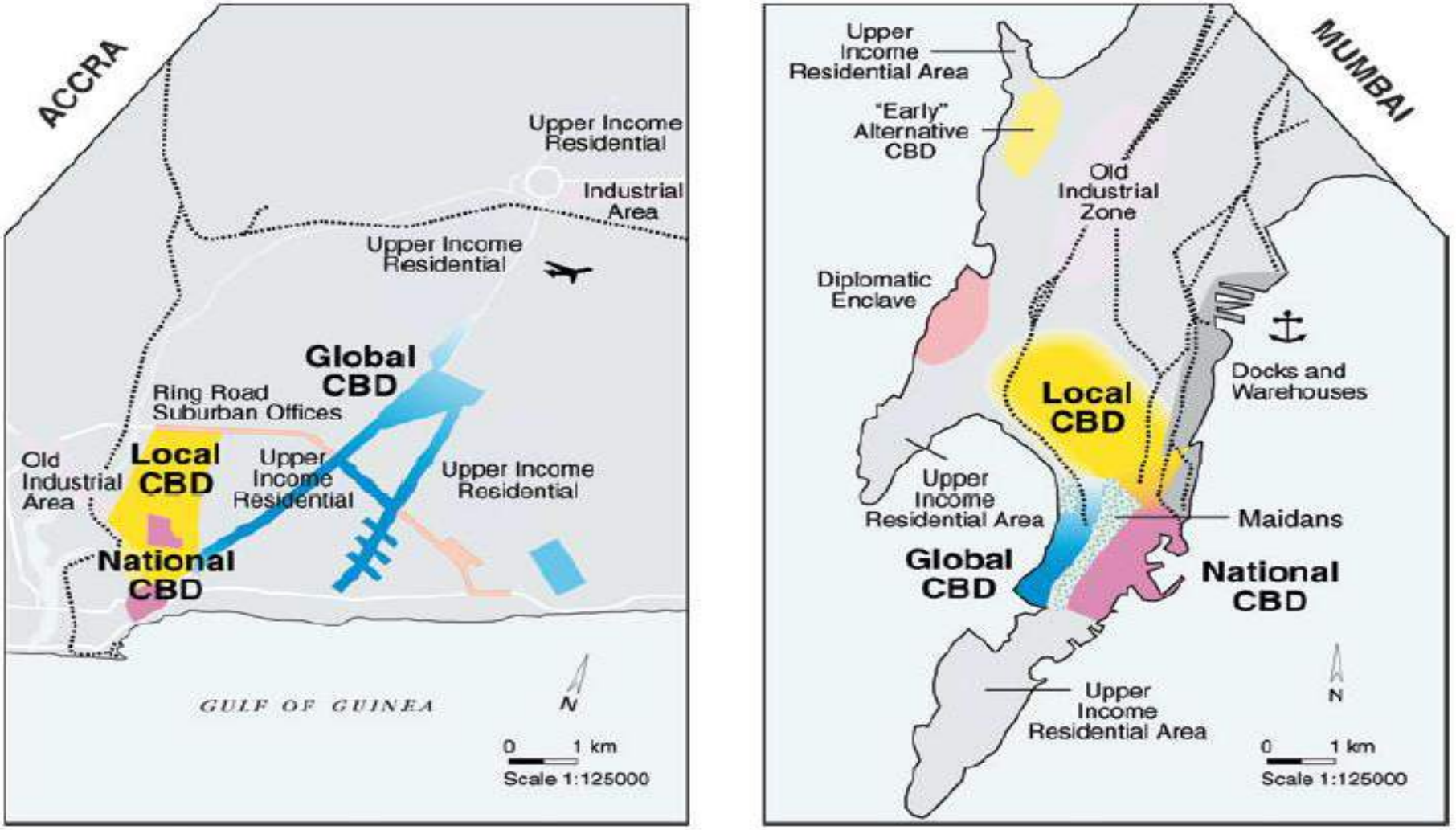


Figure 11: A schematic representation of the economic geographies of Accra and Mumbai during the global phase.

Grant and Nijman, 2002

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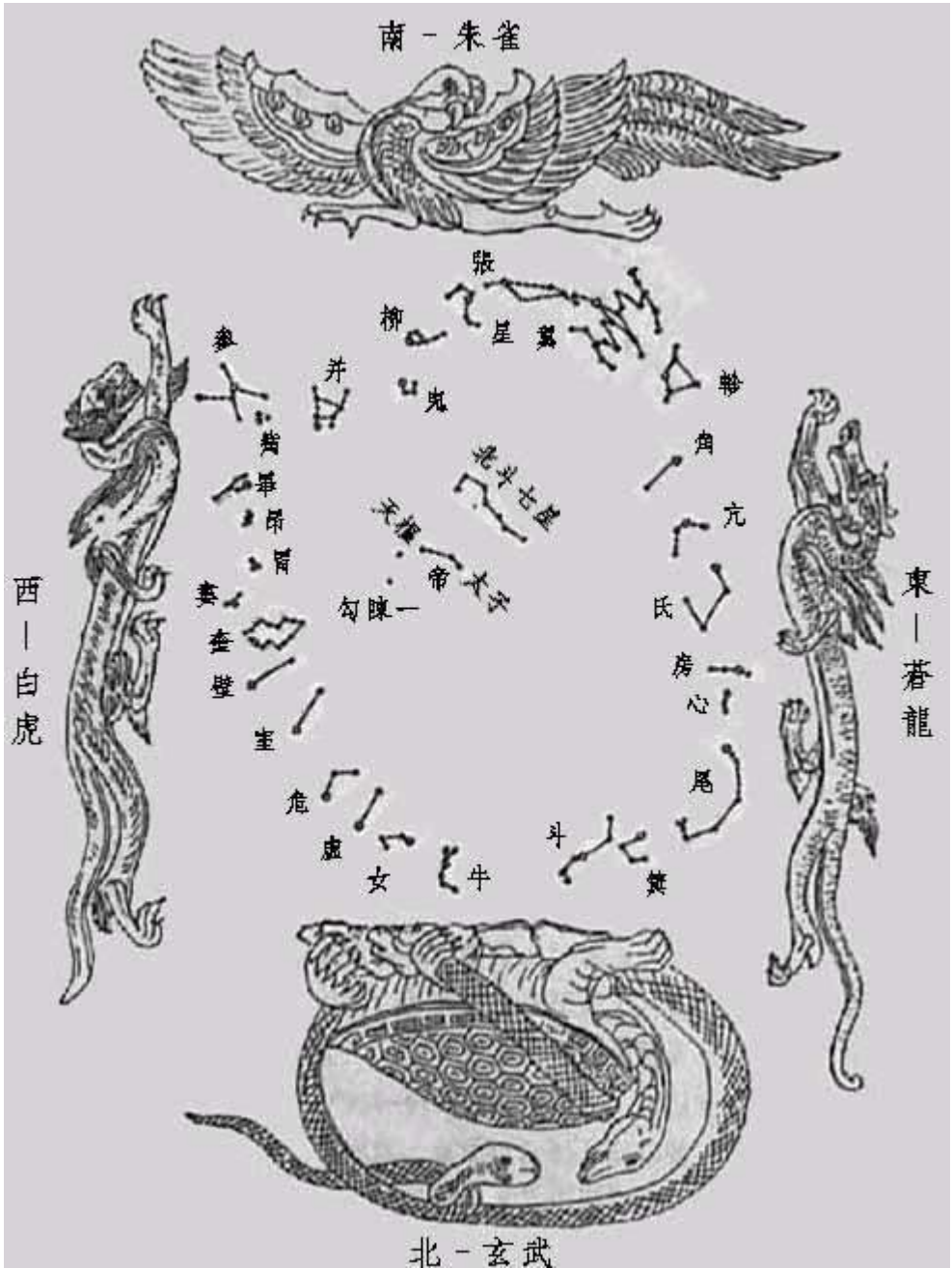
URBAN SPATIAL STRUCTURE OF CHIENSE CITIES: PRE-1949

Cities pre -1949

Fengshui theory



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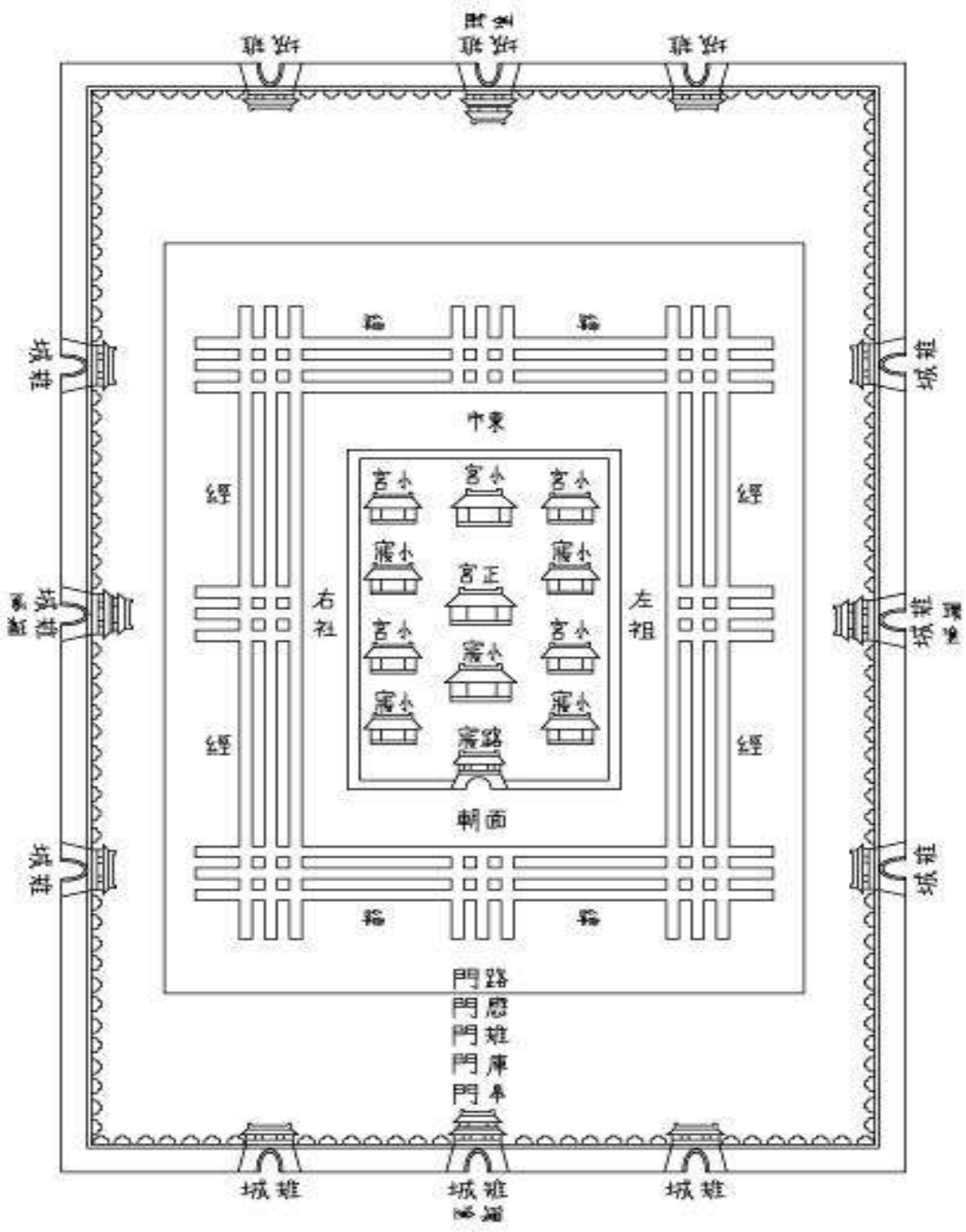
Confucians theory



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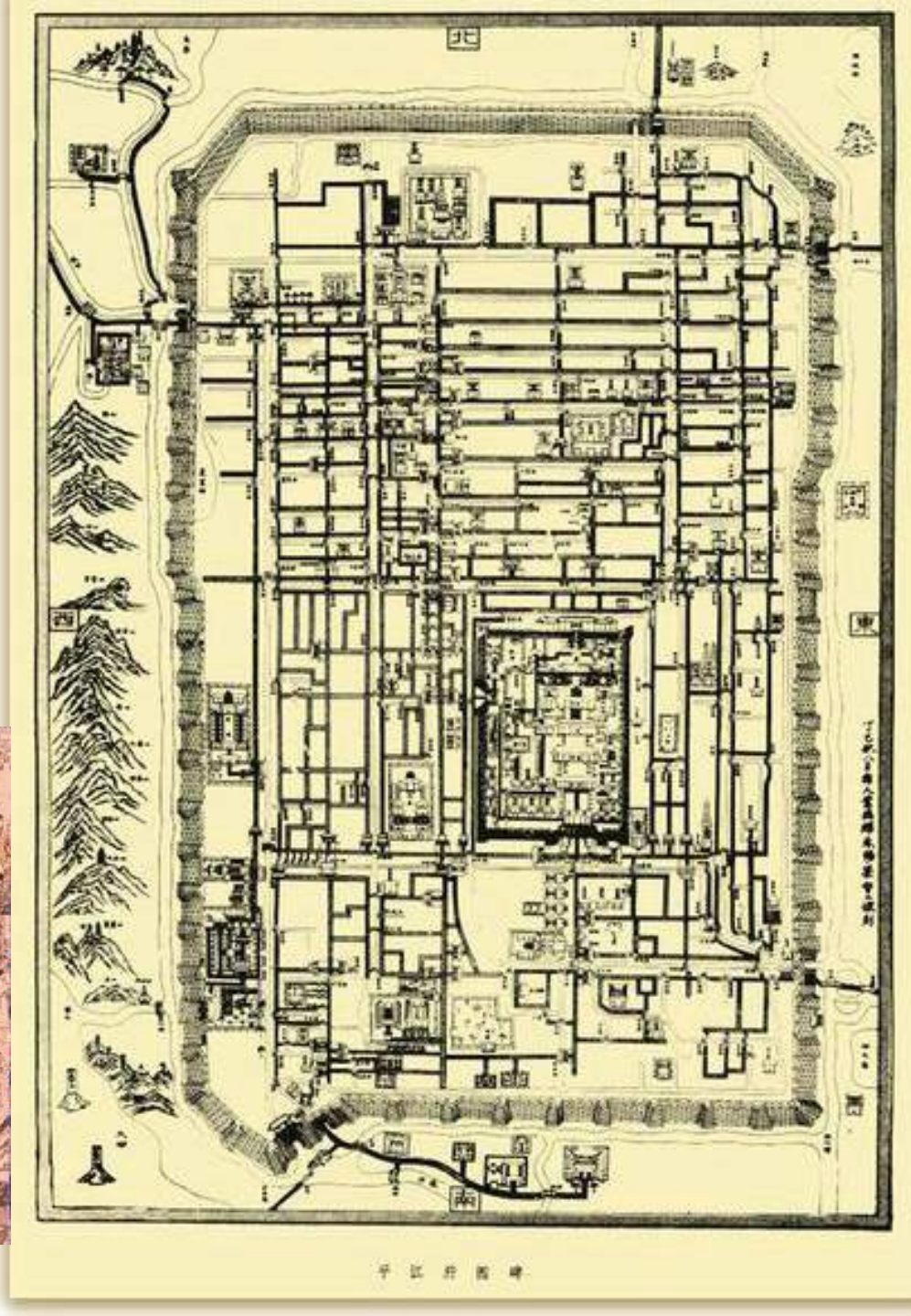
Map of Suzhou in 960 A.D.



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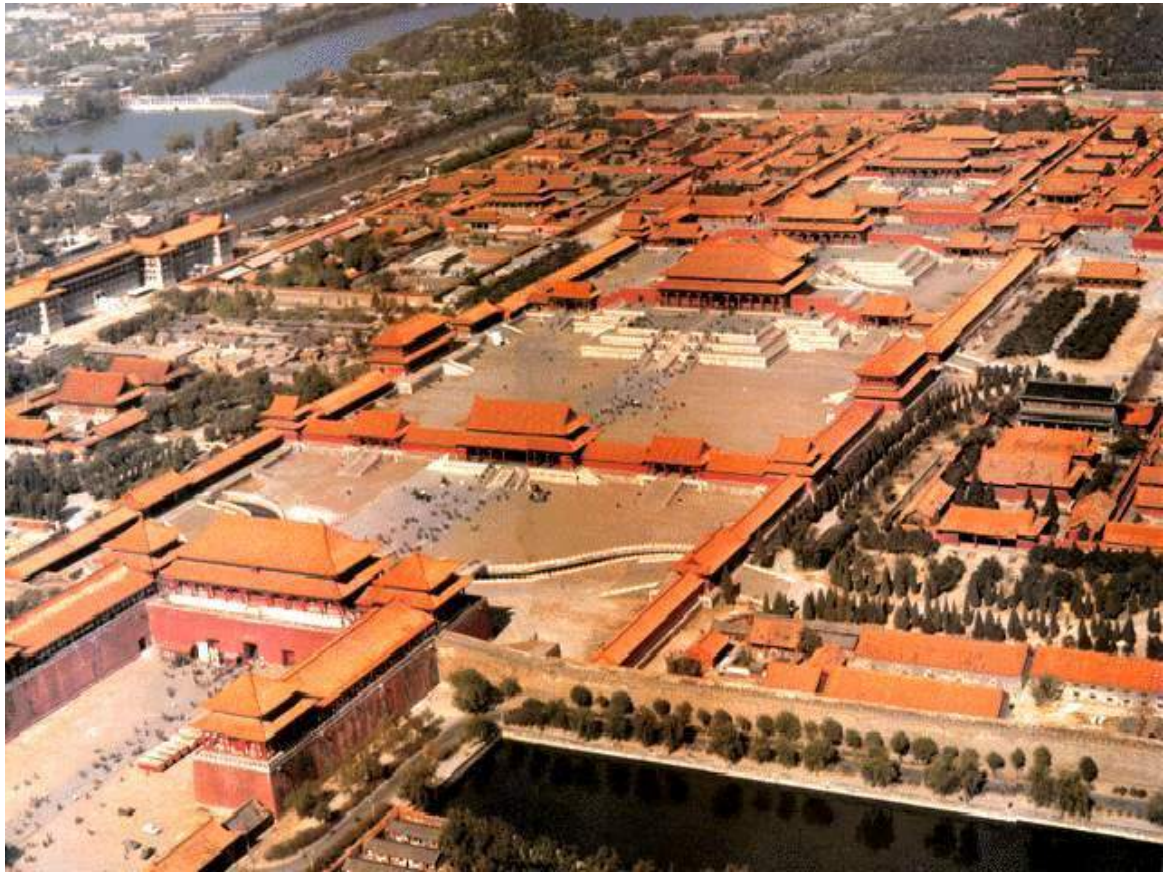
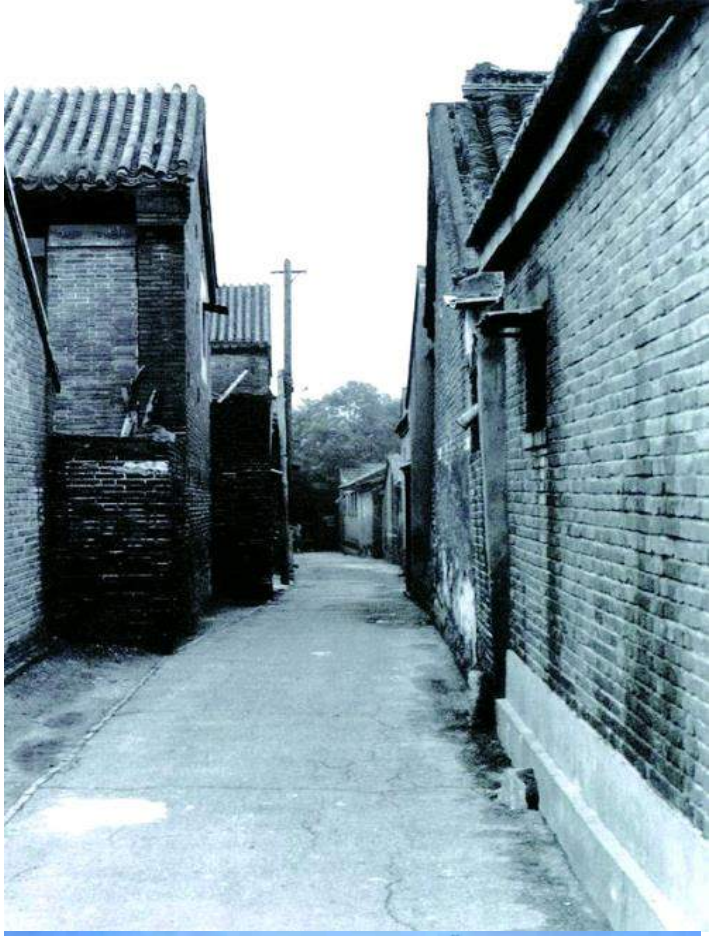
Beijing

- Forbidden city
- Hutong, Siheyuan





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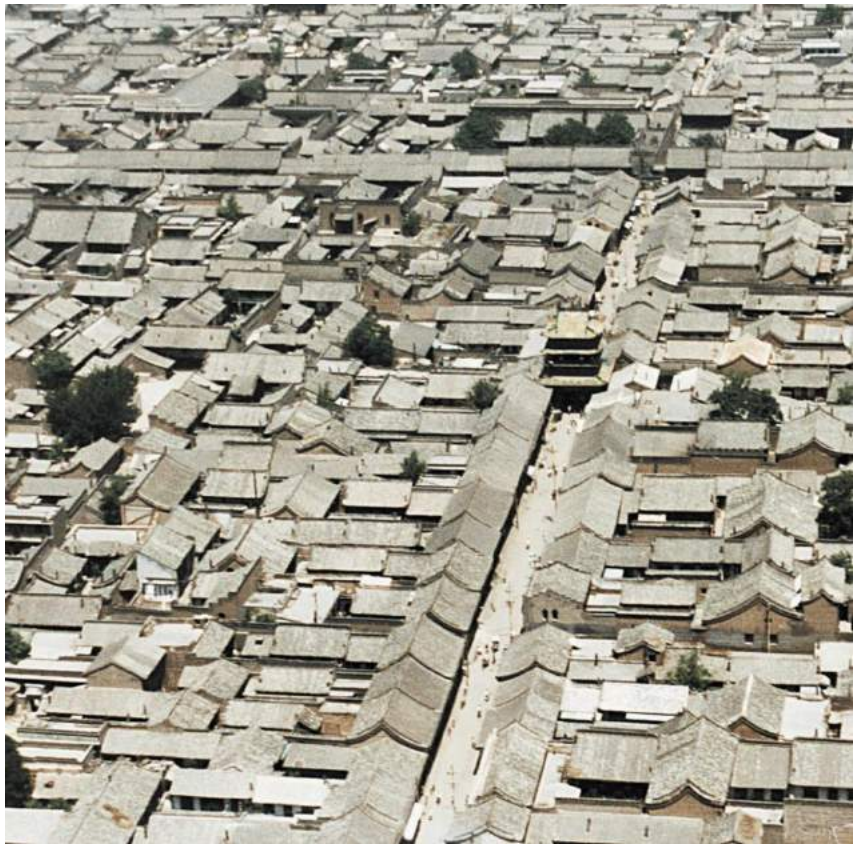
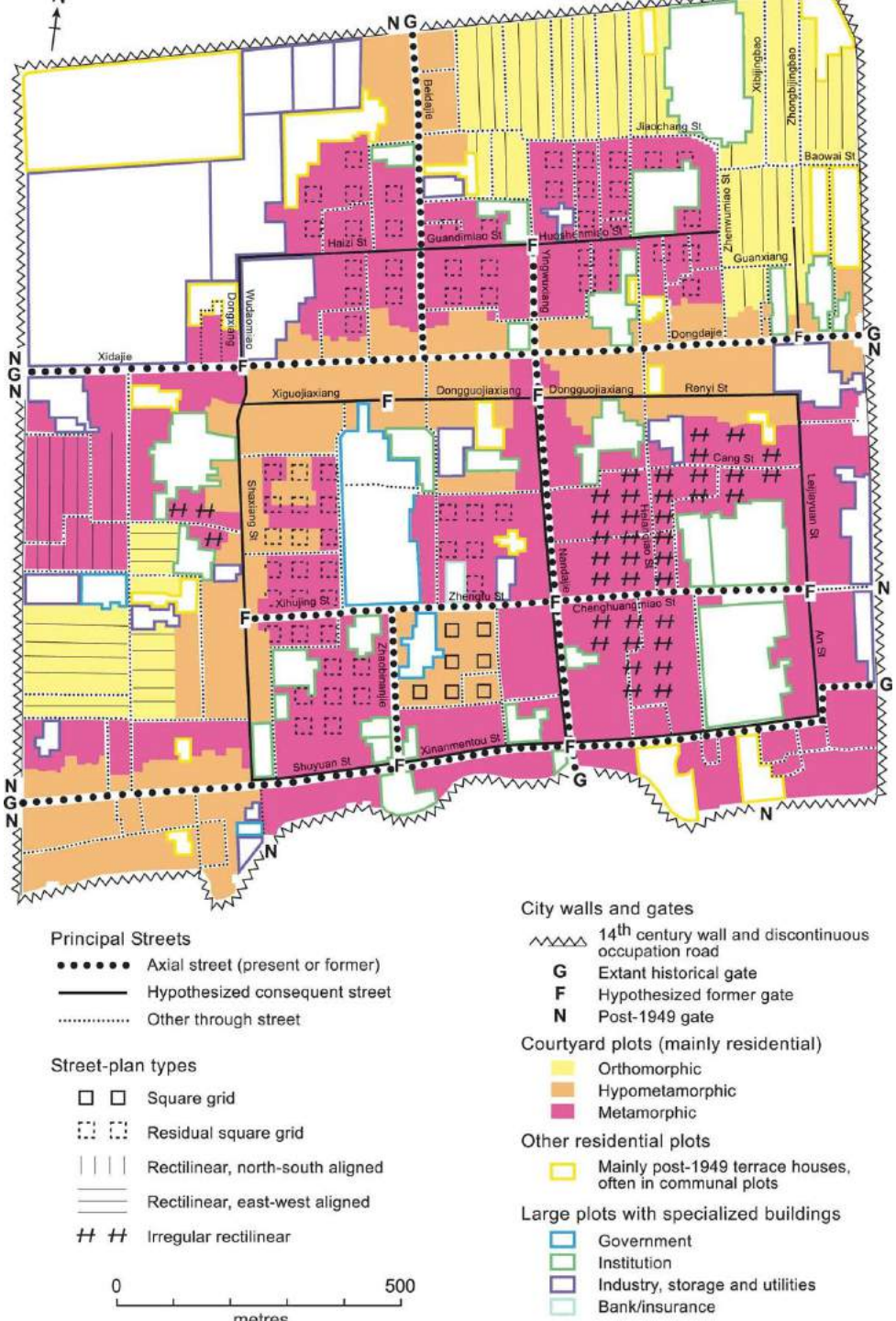


Pingyao (*Gu & Whitehead, 2012)*



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URBAN SPATIAL STRUCTURE OF CHIENSE CITIES: 1949-1978

↑ 1956年，从北京展览馆鸟瞰西直门外大街。　　图：西档

Cities 1949-1978

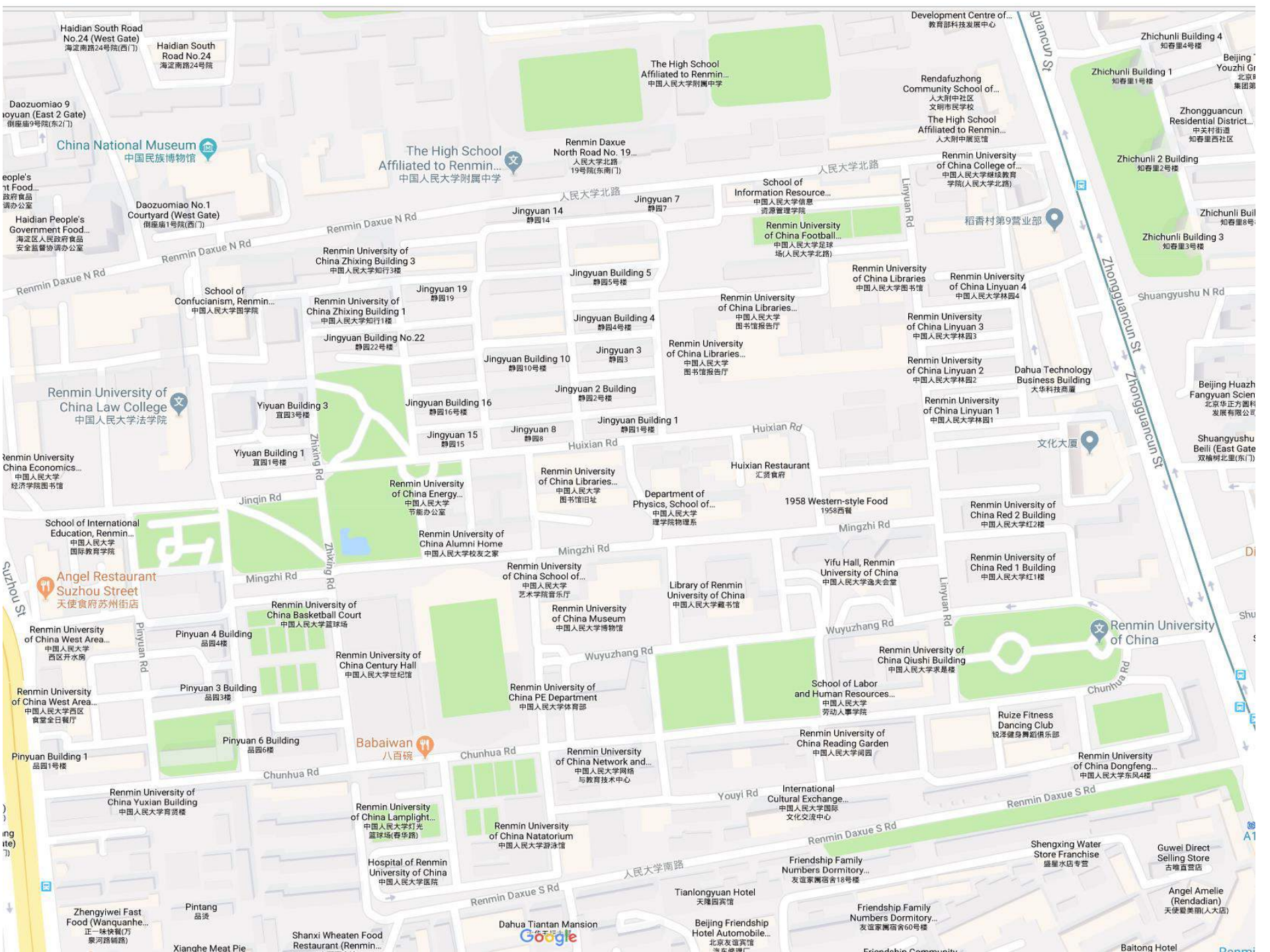
- City center

- Square
- Government office building

Cities 1949-1978

- Danwei compound

✓ Homogenous urban landscape


Haidian South Road No.24 (West Gate)
海淀南路24号院(西门)
Haidian South Road No.24
海淀南路24号院
Development Centre of...
教育部科技发展中心
Zhichunli Building 4
知春里4号楼
Zhichunli Building 1
知春里1号楼
The High School Affiliated to Renmin...
中国人民大学附属中学
Rendafuzhong Community School of...
人大附中社区
文明市民学校
Zhongguancun Residential District...
中关村街道
知春里西社区
Daozuomiao 9
倒座庙9号院(东2门)
China National Museum
中国民族博物馆
The High School Affiliated to Renmin...
中国人民大学附属中学
Renmin Daxue North Road No. 19...
人民大学北路
19号院(东南门)
The High School Affiliated to Renmin...
人大附中展览馆
Renmin University of China College of...
中国人民大学继续教育学院(人民大学北路)
Zhichunli 2 Building
知春里2号楼
人民大学北路
School of Information Resource...
中国人民大学信息资源管理学院
Linyuan Rd
Haidian People's Government Food...
海淀区人民政府食品安全监督协调办公室
Daozuomiao No.1 Courtyard (West Gate)
倒座庙1号院(西门)
Renmin Daxue N Rd
Jingyuan 14
静园14
Jingyuan 7
静园7
Renmin University of China Football...
中国人民大学足球场(人民大学北路)
稻香村第9营业部
Zhichunli Building 3
知春里3号楼
Renmin University of China Zhixing Building 3
中国人民大学知行3楼
Jingyuan Building 5
静园5号楼
Renmin University of China Libraries
中国人民大学图书馆
Renmin University of China Linyuan 4
中国人民大学林园4
Zhongguancun St
Shuangyushu N Rd
School of Confucianism, Renmin...
中国人民大学国学院
Jingyuan 19
静园19
Renmin University of China Zhixing Building 1
中国人民大学知行1楼
Renmin University of China Libraries...
中国人民大学图书馆报告厅
Jingyuan Building 4
静园4号楼
Renmin University of China Linyuan 3
中国人民大学林园3
Jingyuan Building No.22
静园22号楼
Jingyuan 3
静园3
Jingyuan Building 10
静园10号楼
Renmin University of China Linyuan 2
中国人民大学林园2
Dahua Technology Business Building
大华科技商厦
Renmin University of China Law College
中国人民大学法学院
Yiyuan Building 3
宜园3号楼
Jingyuan Building 16
静园16号楼
Jingyuan 2 Building
静园2号楼
Renmin University of China Linyuan 1
中国人民大学林园1
Huixian Rd
Jingyuan 15
静园15
Jingyuan 8
静园8
Jingyuan Building 1
静园1号楼
文化大厦
Yiyuan Building 1
宜园1号楼
Zhixing Rd
Huixian Restaurant
汇贤食府
Renmin University China Economics...
中国人民大学经济学院图书馆
Renmin University of China Energy...
中国人民大学节能办公室
Renmin University of China Libraries...
中国人民大学图书馆旧址
Department of Physics, School of...
中国人民大学理学院物理系
1958 Western-style Food
1958西餐
Renmin University of China Red 2 Building
中国人民大学红2楼
Jinqin Rd
Mingzhi Rd
School of International Education, Renmin...
中国人民大学国际教育学院
Renmin University of China Alumni Home
中国人民大学校友之家
Angel Restaurant Suzhou Street
天使食府苏州街店
Renmin University of China School of...
中国人民大学艺术学院音乐厅
Yifu Hall, Renmin University of China
中国人民大学逸夫会堂
Renmin University of China Red 1 Building
中国人民大学红1楼
Suzhou St
Renmin University of China Basketball Court
中国人民大学篮球场
Renmin University of China Museum
中国人民大学博物馆
Library of Renmin University of China
中国人民大学藏书馆
Renmin University of China West Area...
中国人民大学西区开水房
Pinyuan 4 Building
品园4楼
Pinyuan Rd
Wuyuzhang Rd
Renmin University of China
Renmin University of China Century Hall
中国人民大学世纪馆
Renmin University of China Qiushi Building
中国人民大学求是楼
Renmin University of China West Area...
中国人民大学西区食堂全日餐厅
Pinyuan 3 Building
品园3楼
Renmin University of China PE Department
中国人民大学体育部
School of Labor and Human Resources...
中国人民大学劳动人事学院
Chunhua Rd
Ruize Fitness Dancing Club
锐泽健身舞蹈俱乐部
Pinyuan 6 Building
品园6楼
Babaiwan
八百碗
Renmin University of China Reading Garden
中国人民大学阅园
Pinyuan Building 1
品园1号楼
Renmin University of China Network and...
中国人民大学网络与教育技术中心
Renmin University of China Dongfeng...
中国人民大学东风4楼
Youyi Rd
Renmin University of China Yuxian Building
中国人民大学育贤楼
International Cultural Exchange...
中国人民大学国际文化交流中心
Renmin Daxue S Rd
Renmin University of China Lamplight...
中国人民大学灯光篮球场(春华路)
Renmin University of China Natatorium
中国人民大学游泳馆
Shengxing Water Store Franchise
盛星水店专营
Guwei Direct Selling Store
古唯直营店
Hospital of Renmin University of China
中国人民大学医院
人民大学南路
Friendship Family Numbers Dormitory...
友谊家属宿舍18号楼
Tianlongyuan Hotel
天隆园宾馆
Angel Amelie (Rendadian)
天使爱美丽(人大店)
Zhengyiwei Fast Food (Wanquanhe...
正一味快餐(万泉河路铺路)
Pintang
品汤
Dahua Tiantan Mansion
Beijing Friendship Hotel Automobile...
北京友谊宾馆汽车维理厂
Friendship Family Numbers Dormitory...
友谊家属宿舍60号楼
Shanxi Wheaten Food Restaurant (Renmin...
Xianghe Meat Pie
Google

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URBAN SPATIAL STRUCTURE OF CHIENSE CITIES: POST-1978

Cities post 1978

- **The institutional changes**
  - Cities as growth machine

    Cities are increasingly conceived as a place where land-based elites seek profit through driving the "urban machine" to obtain the increased value of property, rather than as "production sites".

  - Transitional economy

    "The urban transformation in contemporary China is shaped by the interplay between state and market." *(Han, 2000)*.The state, including both the central and local levels, and the market, including both the global and national, are indispensable in the processes of urban development

Cities post 1978

- **The institutional changes**
  - Marketization, decentralization, globalization (Wei, 2007; Lin, 2008)
  - Modernization, industrialization, and motorization

- The story of Chongqing, 2002
- The story of Shanghai, 2006
- The story of Beijing, 2009

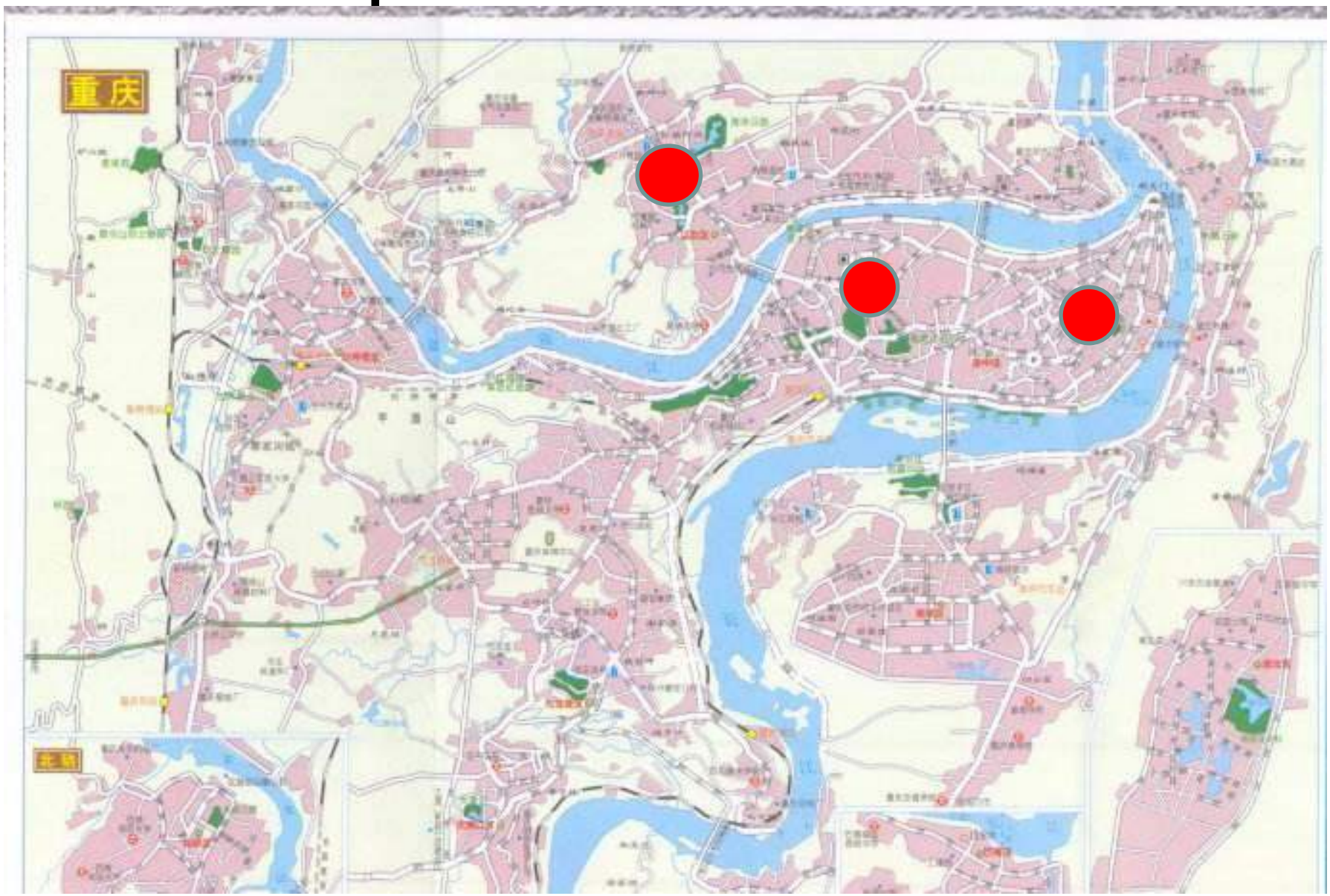
The story of Chongqing: the definition of CBD (2002)

- A planning project from Chongqing Municipal Government (AMR & PKU)

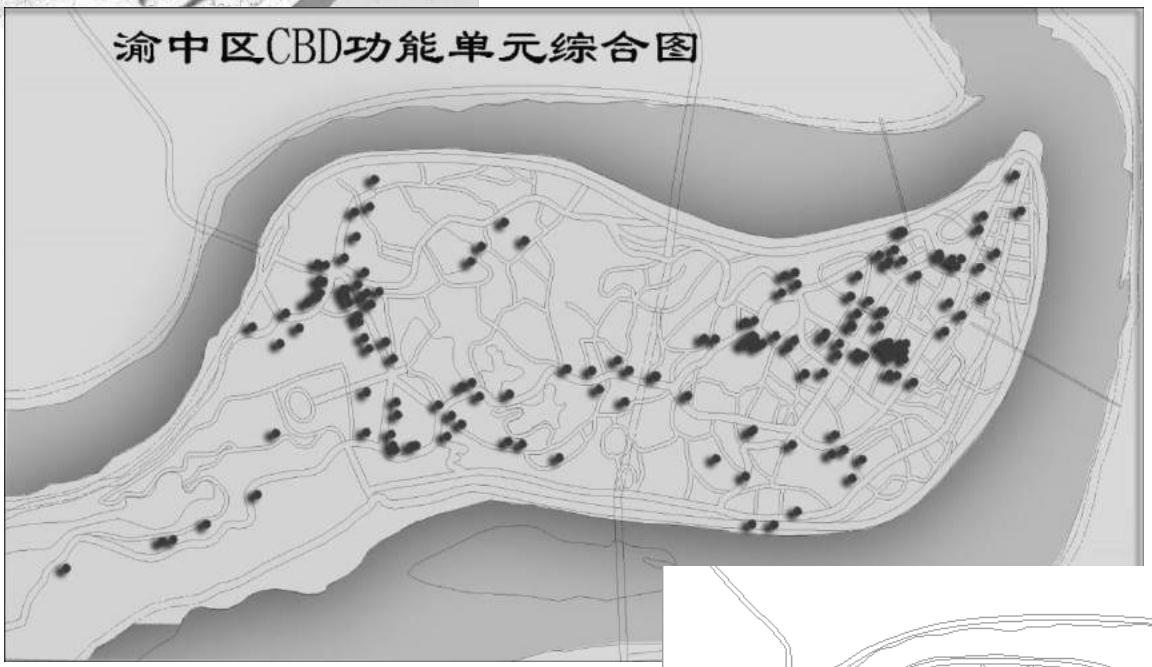
- Policy decision on

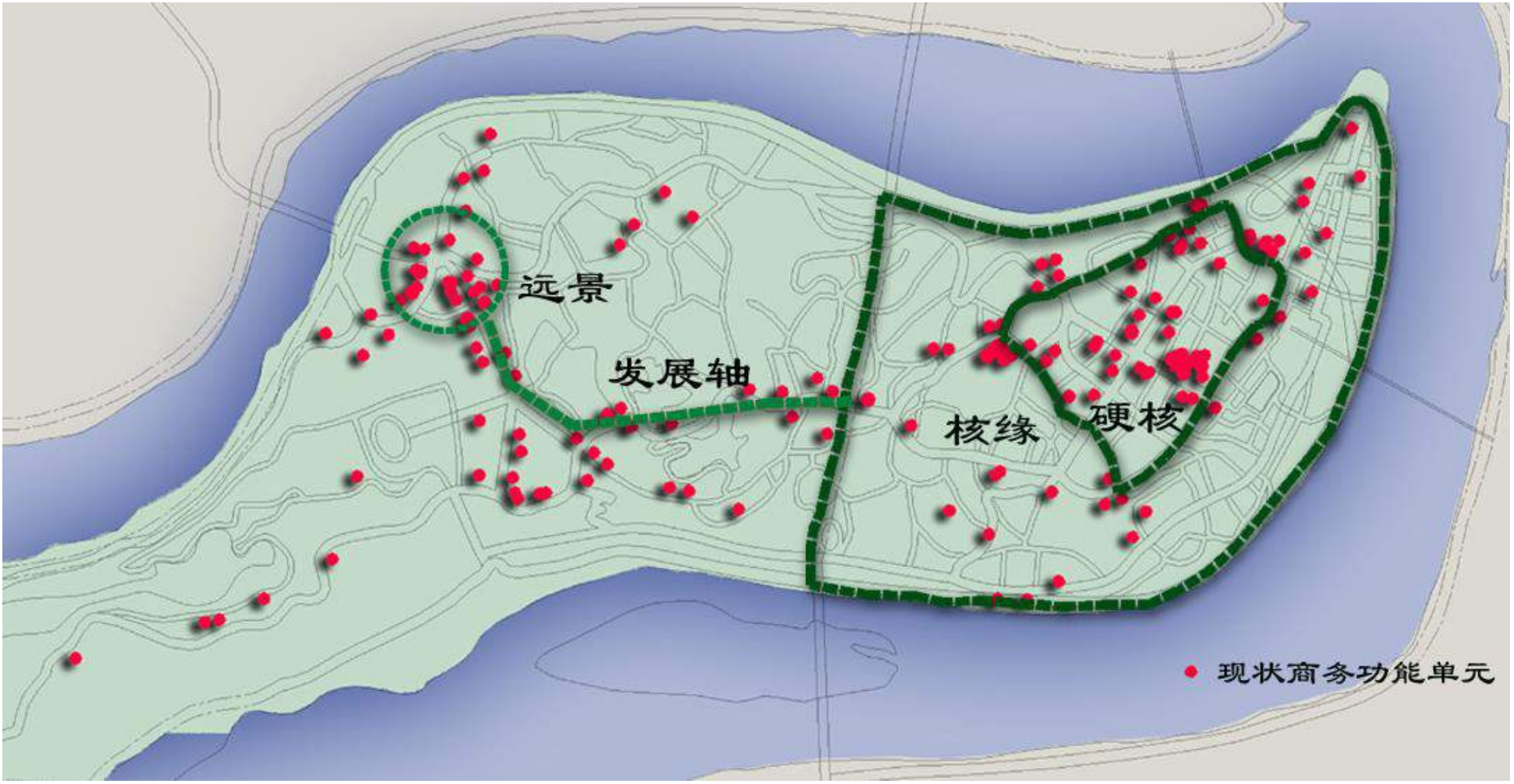
1) Does Chongqing need a CBD?
2) Where should it be?
3) How large is it?

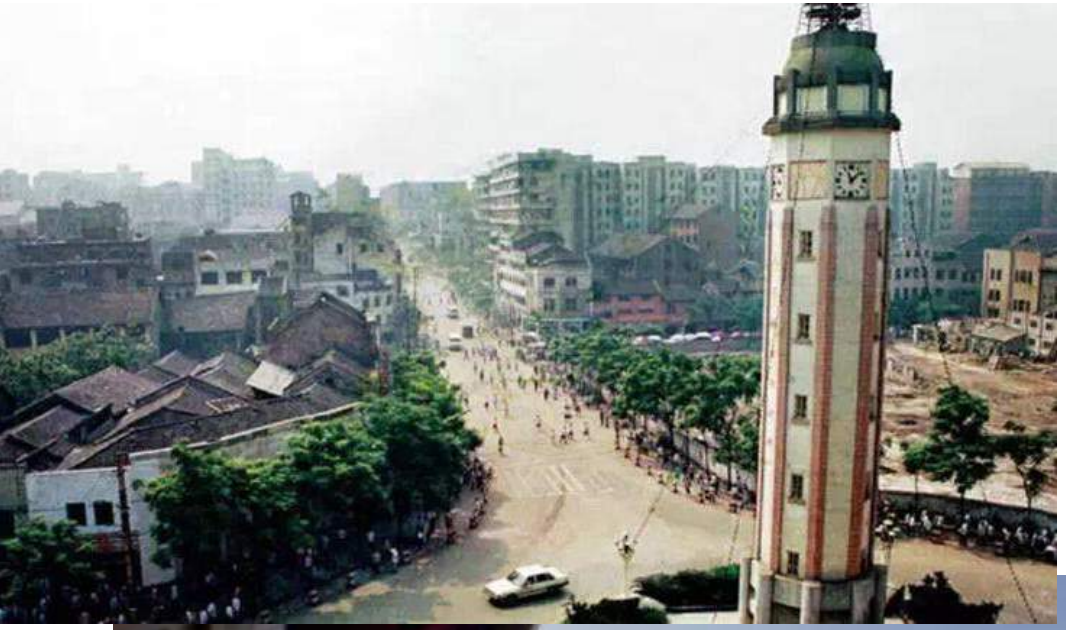
A fundamental question for us - what is the role of planners?


重庆


渝中半岛商业基准地价分布图


渝中区CBD功能单元综合图


远景
发展轴
核缘
硬核
现状商务功能单元




LG


中央商务区（CBD）
弹子石
江北嘴
嘉陵江
长江
解放碑

The story of Shanghai: The definition of urban centers (2006)

- An academic research project
- Urban center(s)

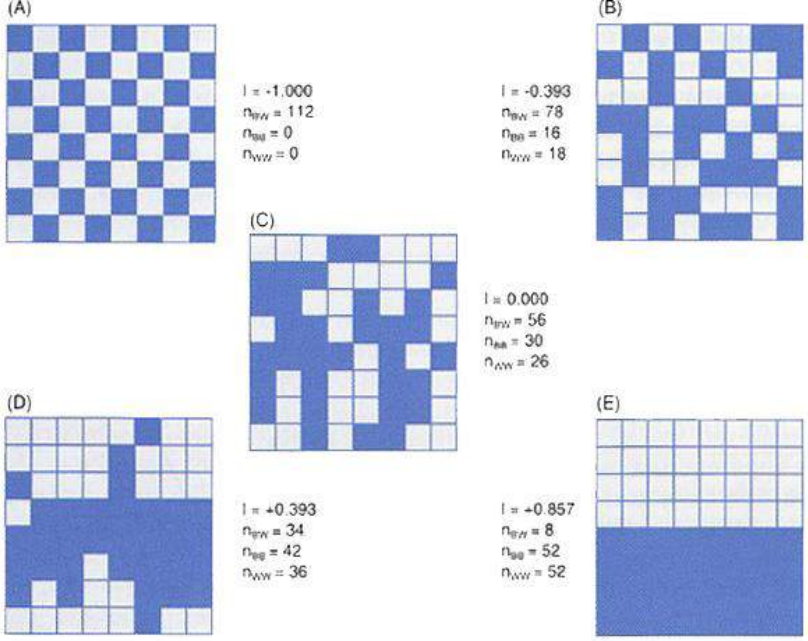
➢ center / cluster

cut-off point (Giuliano and Small, 1991)

$$D(r) = a\exp(br)$$

predefined CBD and residuals (McDonald, 1987; McMillen and Smith, 2003)

✓ Cluster (high-high spatial autocorrelation)
✓ Influence (explanation power)



- **LISA**

$$Ii = z_i \sum_j w(i,j) z_j = \frac{x_i - \bar{x}}{\frac{\sum_{j=1, j\neq i}^{N} x_j^2}{N} - \bar{x}^2} \sum_{j=1}^{N} w(i,j)(x_j - \bar{x})$$

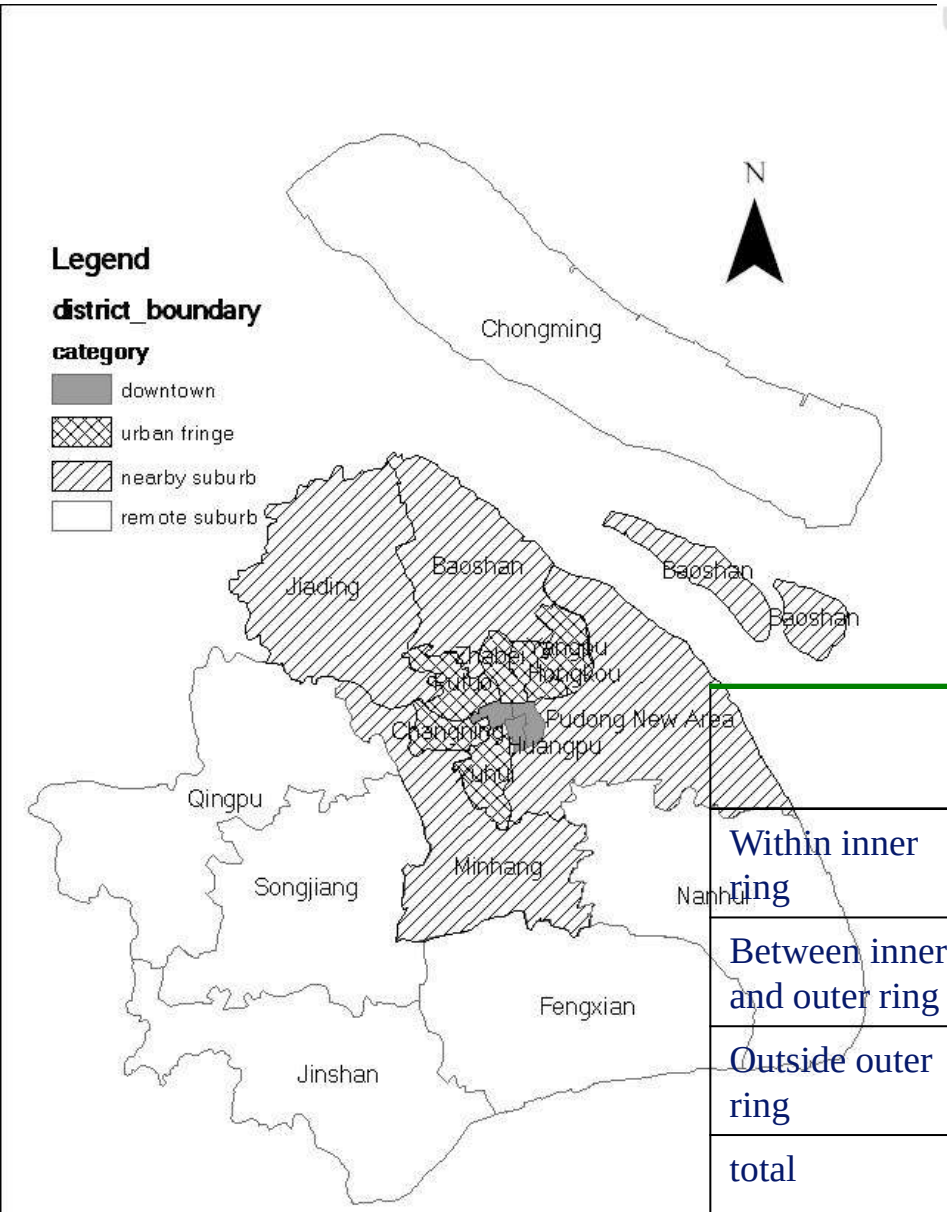
$$I = \frac{N \sum_{i=1}^{N} \sum_{j=1, j\neq i}^{N} w(i,j)(x_i - \bar{x})(x_j - \bar{x})}{\left[\sum_{i=1}^{N} \sum_{j=1, j\neq i}^{N} w(i,j)\right] \sum_{i=1}^{N} (x_i - \bar{x})^2}$$

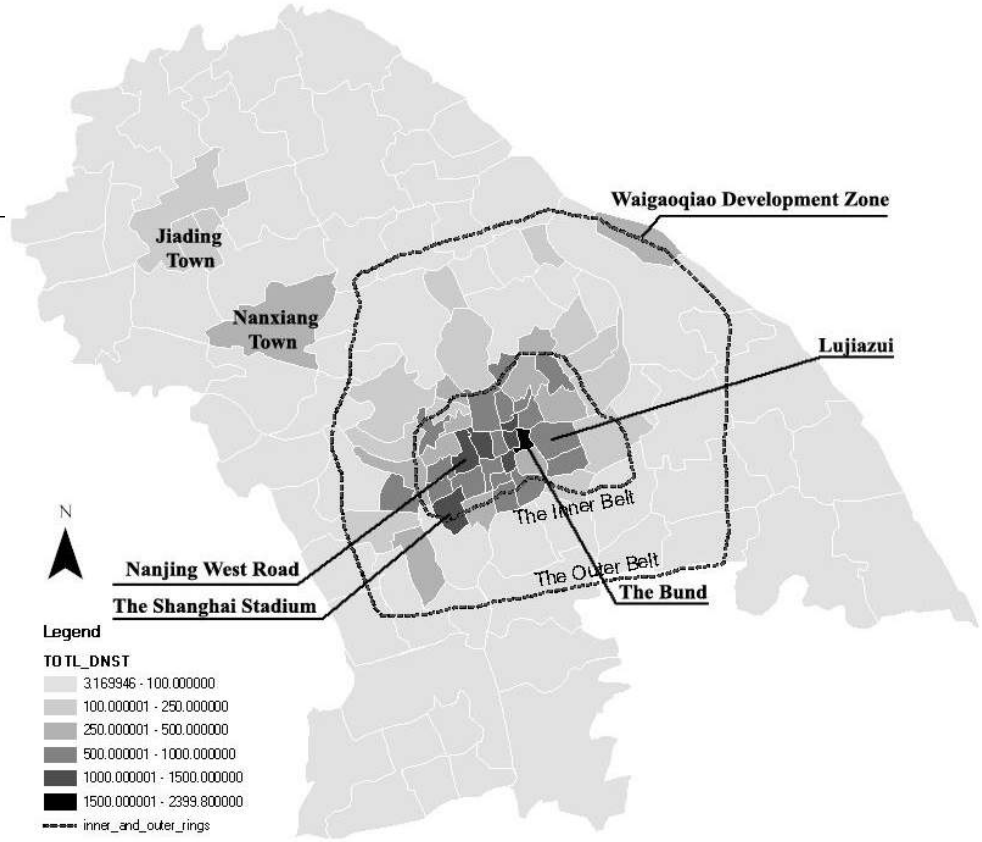
- **Monocentric model:** **mapping the residuals, running LISA again,**

- **Polycentric model:** $D(m) = \sum a_n \exp(b_n r_{mn})$

mapping the residuals again, running LISA again, till no significance

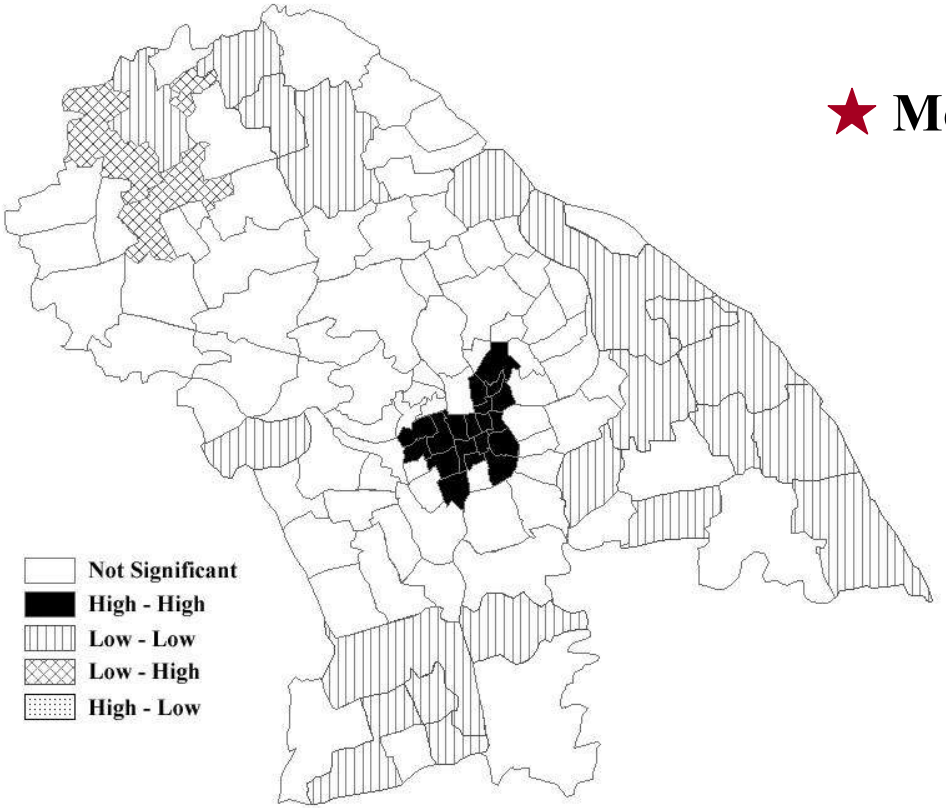
Study area





	Post district	Min firm density	Max firm density	mean	s.d.
Within inner ring	29	152.85	2399.80	766.16	463.61
Between inner and outer ring	39	7.79	714.37	176.54	181.81
Outside outer ring	47	3.17	273.62	47.12	52.66
total	115	3.17	2399.80	272.33	389.45

The spatial pattern of producer services firms

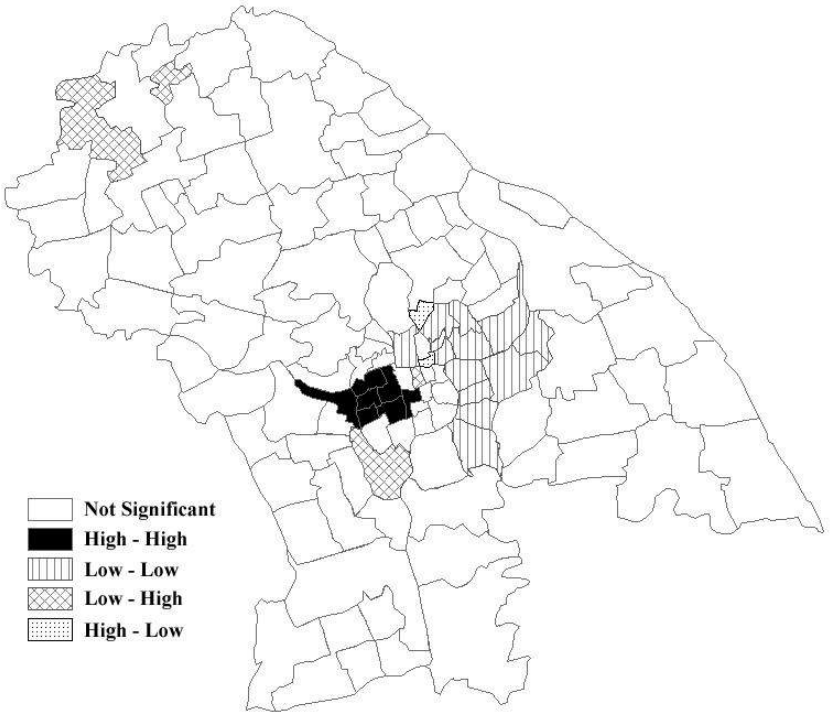


★ Moran's I and mono-centric model

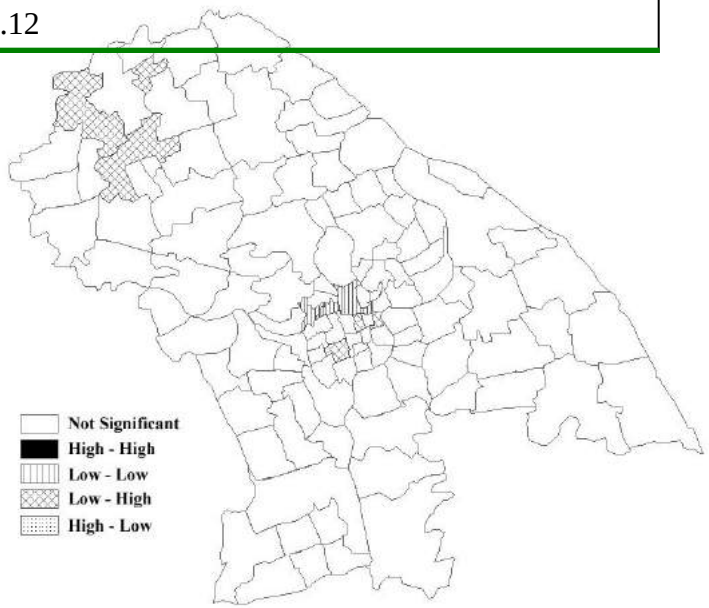
公式	$D = a_1 * \exp(b_1 * DCBD)$	
	Coefficient	T value
a	1600.66***	11.86
b	-0.24***	9.91
R square = 0.68		
Moran's I = 0.32 (0.67)		

The Bund

★ Polycentric urban model



Function: $D = a_1 * \exp(b_1 * DCBD) + a_2 * \exp(b_2 * DNJWR)$		
	Coefficient	T value
a_1	1671.04***	7.00
b_1	-0.59***	5.19
a_2	1021.04***	8.22
b_2	-0.22***	7.49
R square = 0.79		
Moran's I = -0.12		



Nanjing West Road

No other center

Domestic firms and overseas firms

★ Domestic firms

Function: $D = a_1 * \exp(b_1 * DCBD)$

	coefficient	T value
a	1343.78***	13.05
b	-0.23***	10.95
R square = 0.71		
Moran's I of residuals = 0.17 (0.68)		

Function: $D = a_1 * \exp(b_1 * DCBD) + a_2 * \exp(b_2 * DNJWR)$

	coefficient	T value
a_1	1388.15***	7.67
b_1	-0.56***	5.56
a_2	771.83***	8.15
b_2	-0.20***	7.79
R square = 0.81		
Moran's I of residuals = -0.14		

First center：The Bund

Second：Nanjing West Road

No other center

★ overseas firms

$D = a * \exp(b * DCBD)$			$D = a * \exp(b * DNJWR)$	
	Coefficient	T value	Coefficient	T value
a	258.94	5.70	282.99	6.25
b	-0.27	4.92	-0.27	5.61
R square = 0.35			R square = 0.40	
Moran's I of residuals = 0.34 (0.55)			Moran's I of residuals = 0.28 (0.55)	

Function: $D = a_1 * \exp(b_1 * DNJWR) + a_2 * \exp(b_2 * DCBD)$		
	Coefficient	T value
a_1	284.84***	3.24
b_1	-0.66***	2.59
a_2	271.22***	5.33
b_2	-0.39***	4.28
R square = 0.51		
Moran's I of residuals = 0.11		

First center：Nanjing West Road
Second：The Bund

No other center

- **Dual centers pattern: deconcentrated concentration**

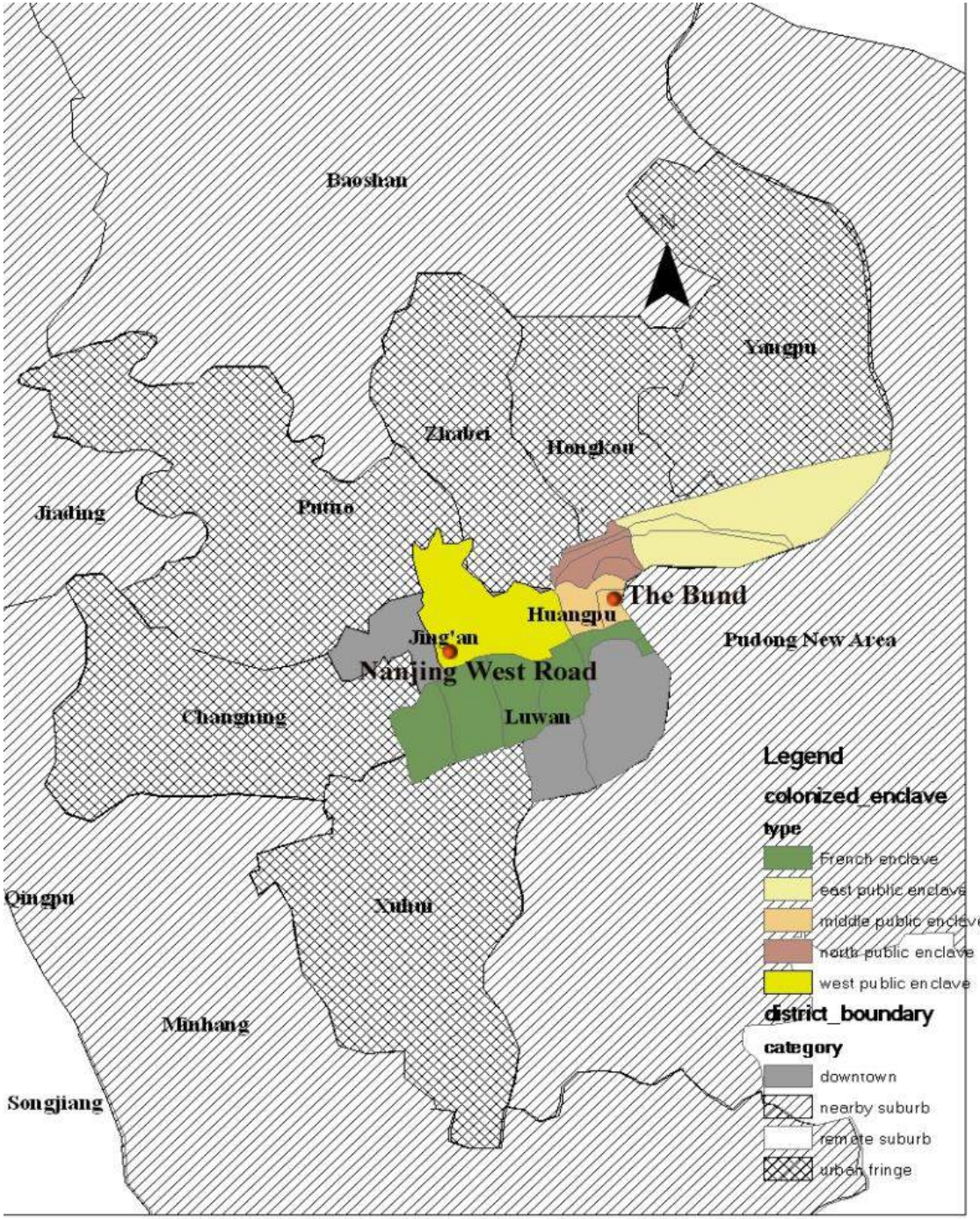
  concentrated deconcentration：Atlanta (Fujii and Hartshorn, 1995)、Philly (Bodenman, 1998), et al..

  dispersion：L.A. (Gordan and Richardson, 1996)

- **global CBD vs. local CBD**

  Shanghai: the first center/local CBD

  Seoul (Park and Nahm, 1998); Sydney(Searle, 1998)



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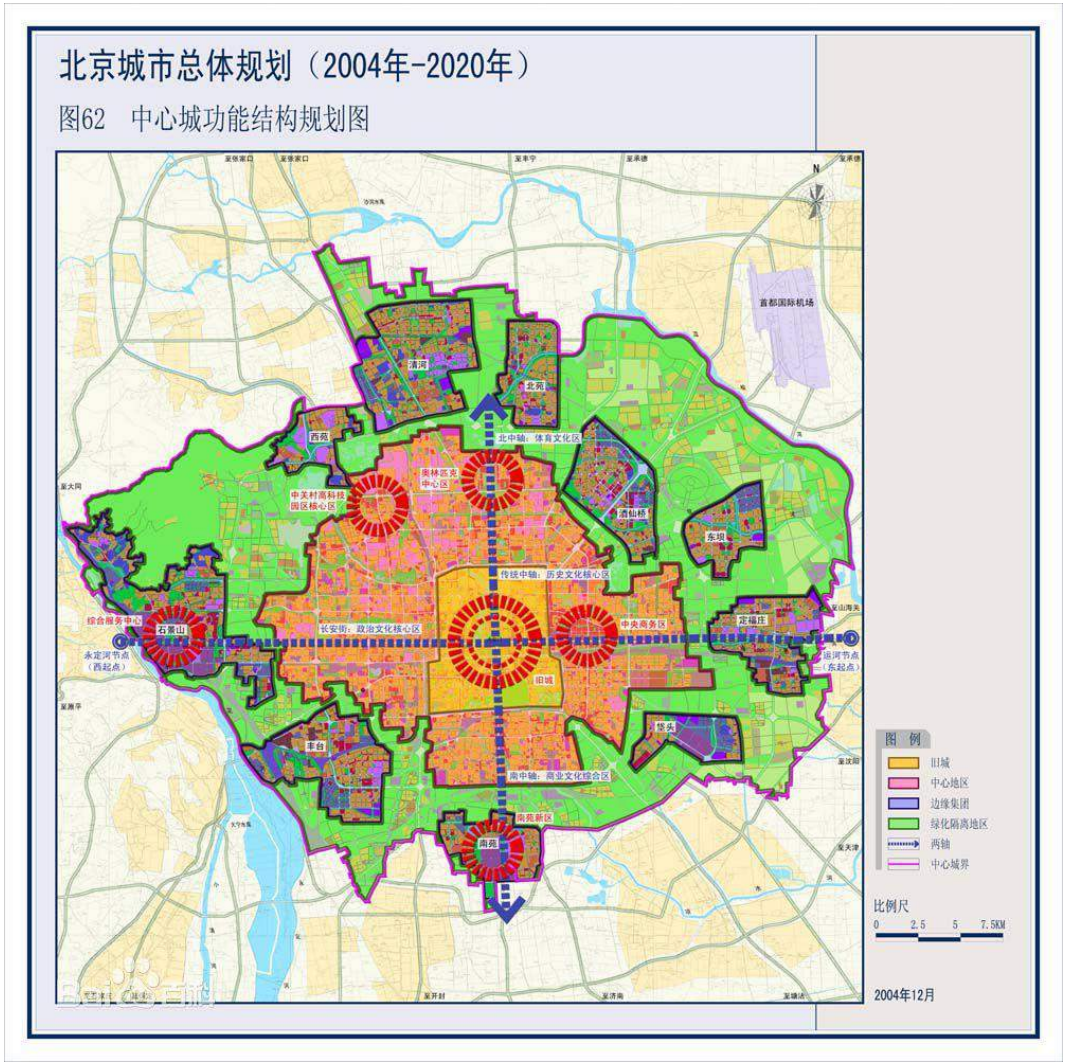
The story of Beijing: The emergence of polycentricity (2009)

- Polycentricity ?
- The influences of the multiply “centers” on our urban life
- The differences among the urban centers



$$\ln(price_i) = \beta_0 + \beta_1 \ln X_{1,i} + \beta_2 \ln X_{2,i} + \beta_3 \ln X_{3,i} + \varepsilon_i$$

where $price_i$ = transaction price for house i,

$X_{1,i}$ = a vector of structural attributes for house i,

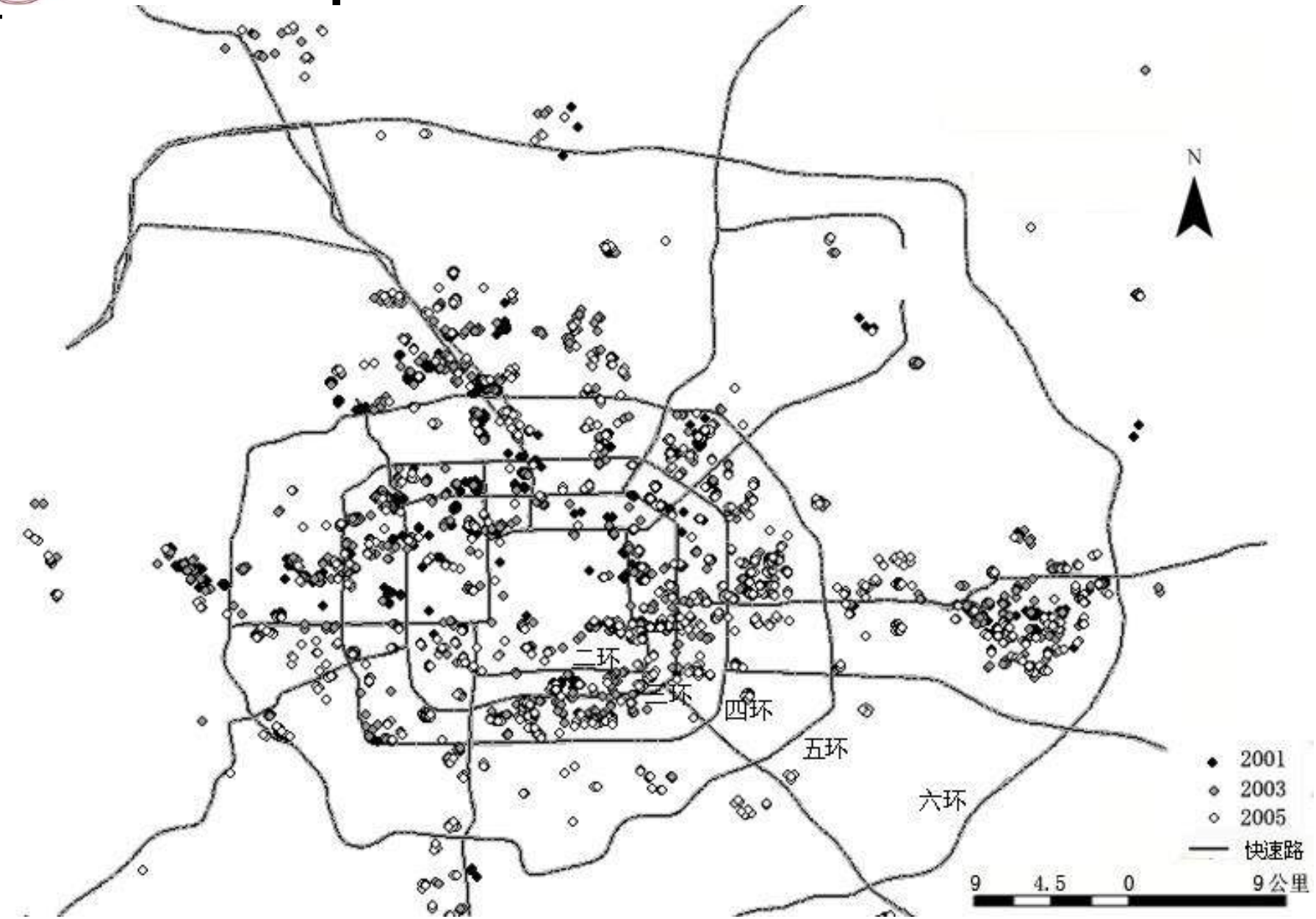
$X_{2,i}$ = a vector of neighborhood attributes for house i,

$X_{3,i}$ = a vector of location attributes for house i,

β_0, β_1, β_2, β_3 = empirically estimated coefficients, and

ε_i = an error term assumed to be independent across observations and identically

Housing transaction prices in Beijing in 2001, 2003 and 2005.


N
二环
三环
四环
五环
六环
2001
2003
2005
快速路
9
4.5
0
9公里

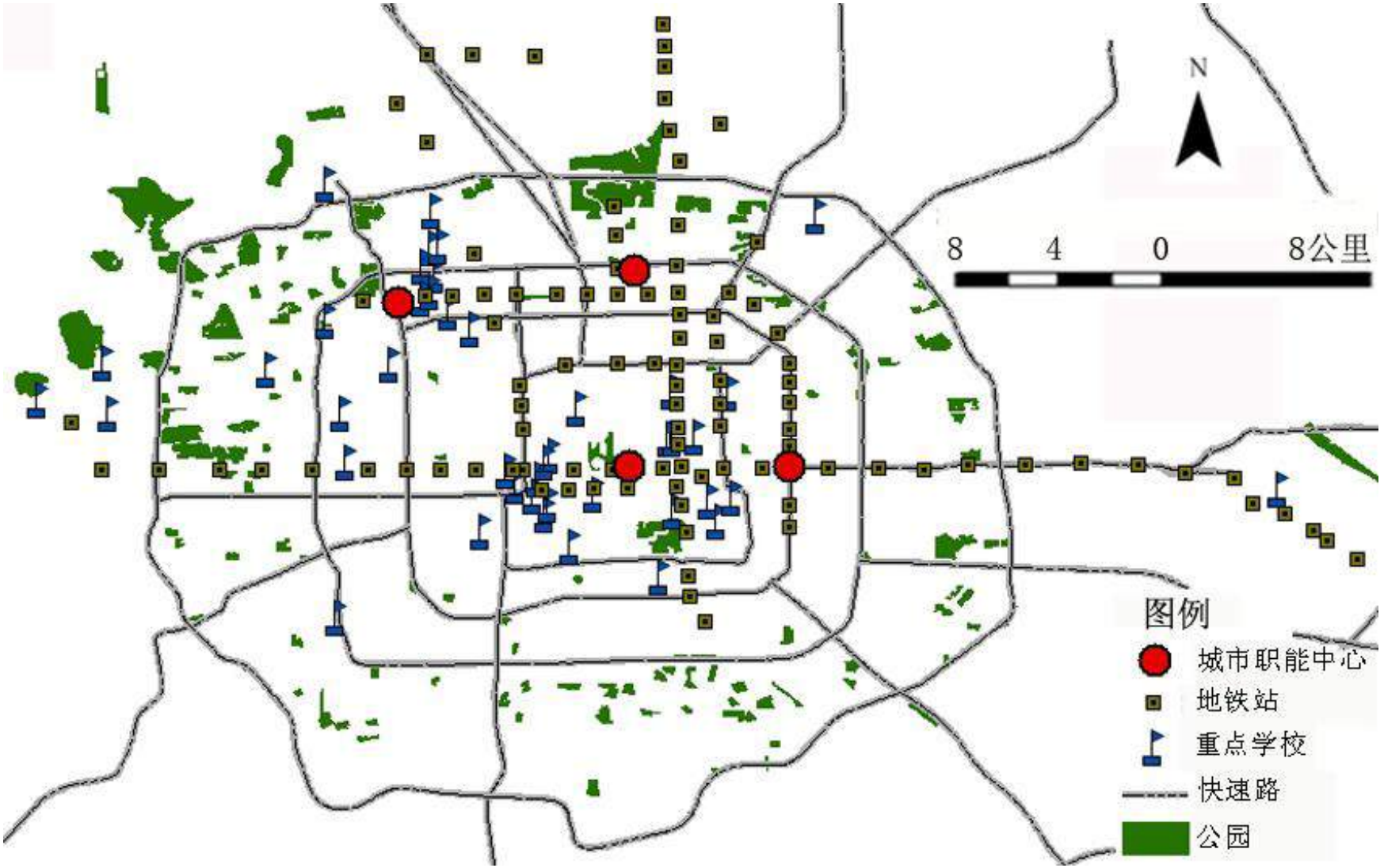

N
8 4 0 8公里
图例
城市职能中心
地铁站
重点学校
快速路
公园

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Table 2. GLS regression statistics, 2001 (n = 1013)

Independent variables	*Model 1 Tian'anmen*	*Model 2 CBD*	*Model 3 Zhongguancun*	*Model 4 Olympic Centre*
CONSTANT	12.899***	12.115***	10.890***	11.385***
	(132.28)	(67.50)	(37.39)	(94.54)
AREA	1.305***	1.348***	1.368***	1.356***
	(349.05)	(56.70)	(43.63)	(87.95)
LEVEL	0.064***	0.089***	0.121***	0.107***
	(16.08)	(10.07)	(15.27)	(12.55)
PARK	−0.082***	−0.136***	−0.137***	−0.088***
	(−9.90)	(−10.06)	(8.68)	(−7.61)
SCHOOL	0.044***	−0.030**	−0.025**	−0.078***
	(27.74)	(−3.672)	(−2.67)	(−8.93)
SUBWAY	−0.070***	−0.079***	−0.139***	−0.099***
	(−11.39)	(−11.29)	(−11.66)	(11.67)
HIGHWAY	−0.081***	−0.159***	−0.153***	−0.142***
	(−20.02)	(−13.95)	(−11.40)	(−14.11)
TIANANMEN	−0.488***			
	(−44.38)			
CBD		−0.263***		
		(−14.12)		
ZHONGGUANC			−0.114***	
			(−9.16)	
OLYMPIC				−0.194***
				(−13.86)
Adjusted R^2	0.98	0.96	0.90	0.93
White test (p-value)	0.98	0.55	0.71	0.54

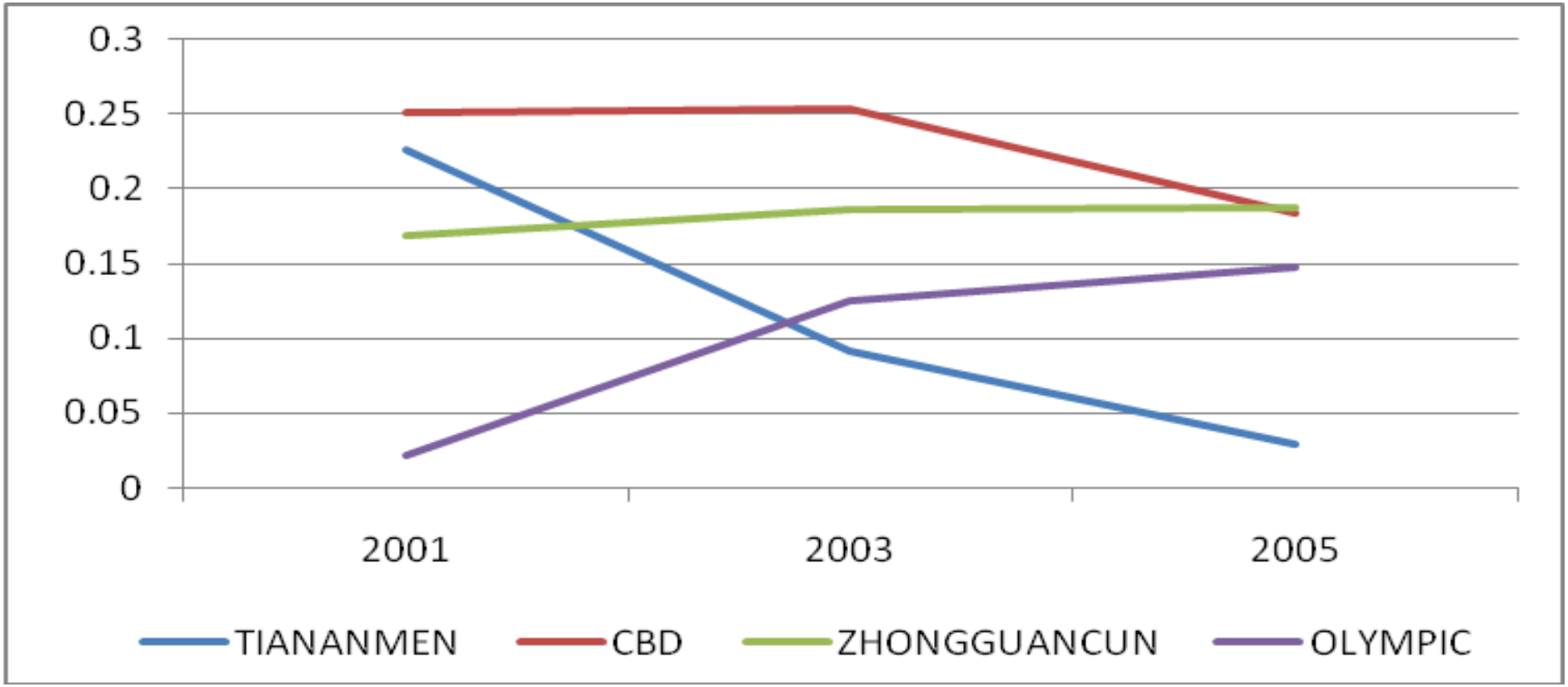
Table 3. GLS regression statistics, 2003 (n = 1314)

Independent variables	*Model 1 Tian'anmen*	*Model 2 CBD*	*Model 3 Zhongguancun*	*Model 4 Olympic Centre*
CONSTANT	12.126***	11.881***	11.807***	12.880***
	(87.77)	(109.78)	(75.63)	(151.38)
AREA	1.209***	1.158***	1.103***	1.113***
	(76.85)	(90.25)	(83.35)	(96.81)
LEVEL	0.064***	0.057***	0.087***	0.073***
	(15.59)	(8.74)	(13.57)	(9.90)
PARK	−0.023*	−0.058***	−0.037**	−0.012*
	(−2.47)	(−5.47)	(−3.98)	(−2.41)
SCHOOL	−0.016*	−0.101***	−0.086***	−0.133***
	(−2.21)	(−14.55)	(−9.16)	(−23.54)
SUBWAY	−0.077***	−0.058***	−0.128***	−0.072***
	(−13.72)	(−15.24)	(−15.05)	(−15.12)
HIGHWAY	−0.050***	−0.057***	−0.083***	−0.075***
	(−6.27)	(−8.84)	(−11.71)	(−11.53)
TIANANMENE	−0.370***			
	(−30.83)			
CBD		−0.227***		
		(−76.58)		
ZHONGGUANC			−0.152***	
			(−15.16)	
OLYMPIC				−0.297***
				(−42.62)
Adjusted R^2	0.92	0.94	0.91	0.92
White test (p-value)	0.67	0.77	0.73	0.16

Table 4. GLS regression statistics, 2005 (n = 1465)

Independent variables	*Model 1 Tian'anmen*	*Model 2 CBD*	*Model 3 Zhongguancun*	*Model 4 Olympic Centre*	*Model 5 Multicentres*	*VIF*
CONSTANT	12.195***	11.791***	11.719***	12.413***	13.871***	
	(104.58)	(93.70)	(103.26)	(92.31)	(142.61)	
AREA	1.140***	1.134***	1.148***	1.135***	1.122***	1.047
	(85.93)	(68.54)	(177.65)	(82.20)	(121.55)	
LEVEL	0.028***	0.030***	0.055***	0.042***	0.020***	1.100
	(5.28)	(4.72)	(18.48)	(116.36)	(4.76)	
PARK	−0.051***	−0.080***	−0.075***	−0.053***	−0.019***	1.37
	(−11.17)	(−14.60)	(−24.42)	(−10.65)	(−3.58)	4
SCHOOL	−0.026**	−0.084***	−0.059***	−0.091***	−0.039***	1.78
	(−3.10)	(−11.36)	(−10.31)	(−12.66)	(−7.27)	8
SUBWAY	−0.078***	−0.061***	−0.079***	−0.035***	0.005	1.79
	(−13.77)	(−13.18)	(−15.46)	(−6.97)	(1.03)	6
HIGHWAY	−0.061***	−0.092***	−0.094***	−0.086***	−0.024**	1.55
	(−10.80)	(−12.01)	(−28.13)	(−11.47)	(−3.97)	0
TIANANMENE	−0.276***				−0.029*	4.980
	(−19.60)				(−1.99)	
CBD		−0.149***			−0.184***	3.847
		(−22.20)			(−14.15)	
ZHONGGUANC			−0.157***		−0.188***	2.377
			(−10.69)		(−14.74)	
OLYMPIC				−0.256***	−0.148***	2.173
				(−19.06)	(−14.16)	
Adjusted R^2	0.88	0.91	0.95	0.93	0.99	
White test (p-value)	0.84	0.75	0.77	0.74	0.79	

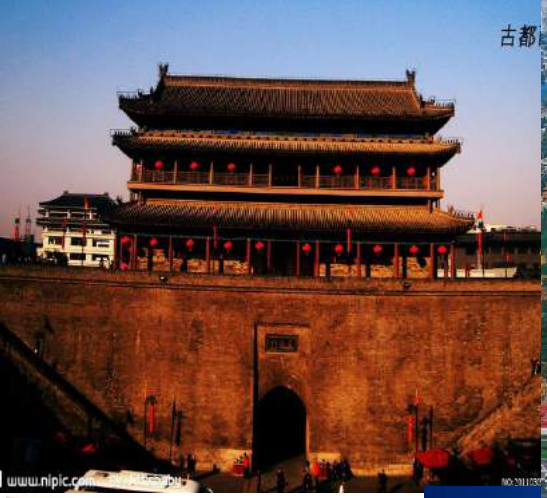
Notes: *** denotes significant at 0.001; ** denotes significant at 0.01; * denotes significant at 0.05. T-values are in parentheses.


0.3
0.25
0.2
0.15
0.1
0.05
0
2001
2003
2005
TIANANMEN
CBD
ZHONGGUANCUN
OLYMPIC

Concluding remarks

- Urban spatial structure as a mirror reflecting
  - ✓ historical process,
  - ✓ socioeconomic restructuring,
  - ✓ and institutional changes

- planning is deeply rooted in institutional context.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Concluding remarks

- Urban spatial restructuring process of the large cities in China
  - ✓ danwei – monocentric – polycentric;
  - ✓ LA model: chaotic, fragmented, random pattern?

- Developing theories for planners working in a highly dynamic urban environment of transitional China
  - ✓ reaching the balance among the sate, the market, and the SOCIETY
  - ✓ a lab for rethinking of institutional design and spatial planning

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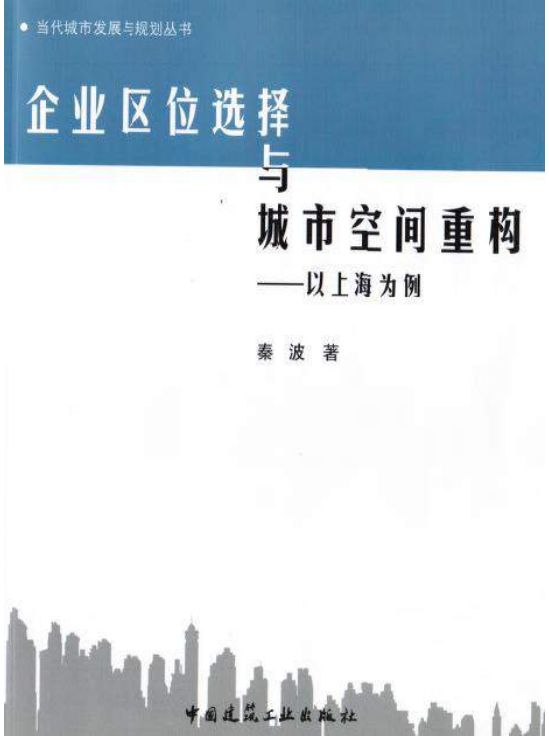

THANK YOU!