

Subsidiarity and Solidarity: Evidence from the Chinese Water Sector

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Motivation

- Subsidiarity
 - Put local matters into local hands
 - Decentralization; environmental federalism
- Solidarity
 - Externality; inter-jurisdictional competition; race to the bottom
 - Federal mandates to prevent inter-state spillover

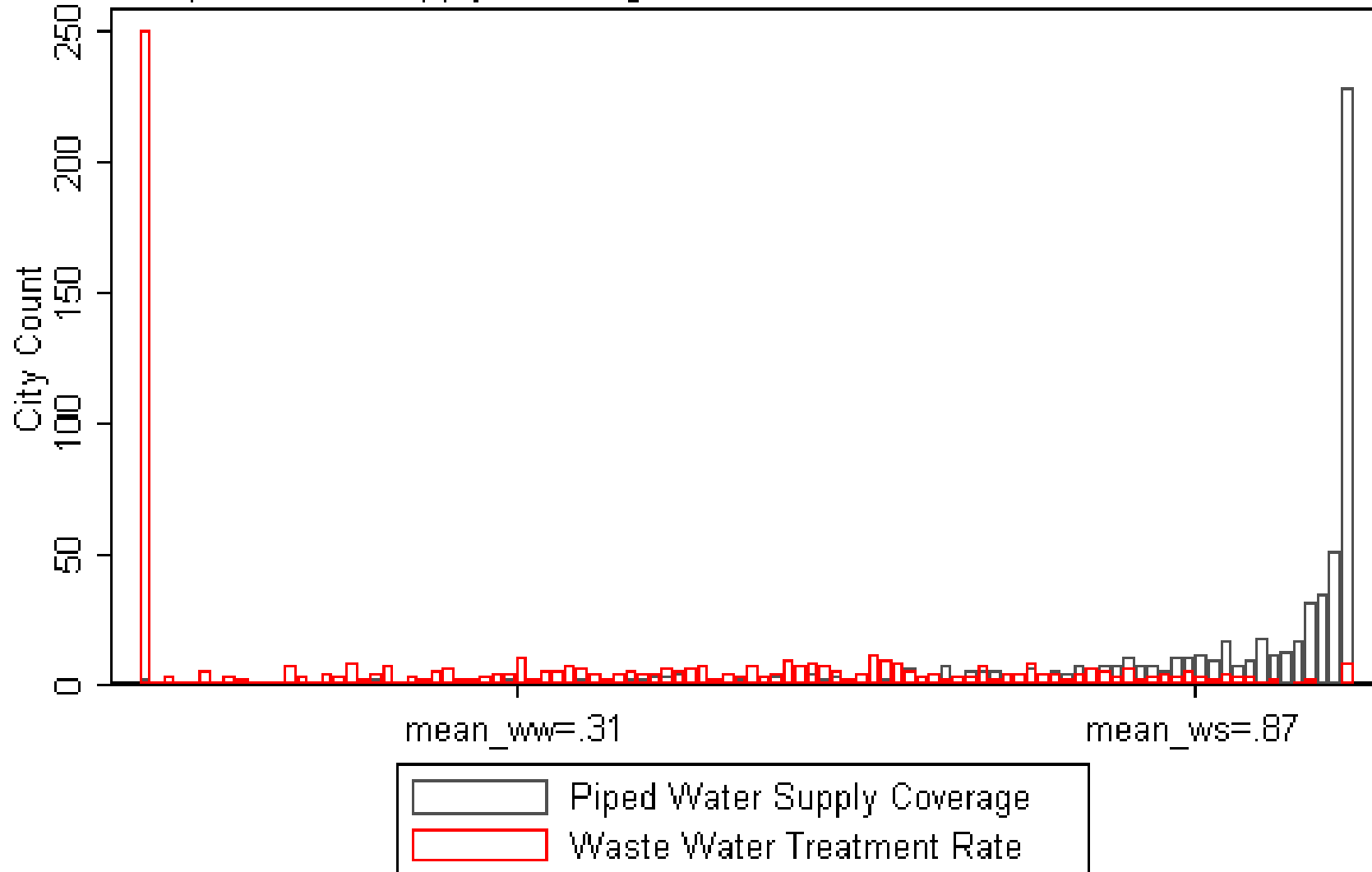
Research Question



- **How does decentralization matter? What is the role of central gov't?**
- China: a centralized country with certain degree of decentralization and fiscal federalism
- In the context of water services sector:
 - Piped water supply coverage
 - Wastewater treatment rate

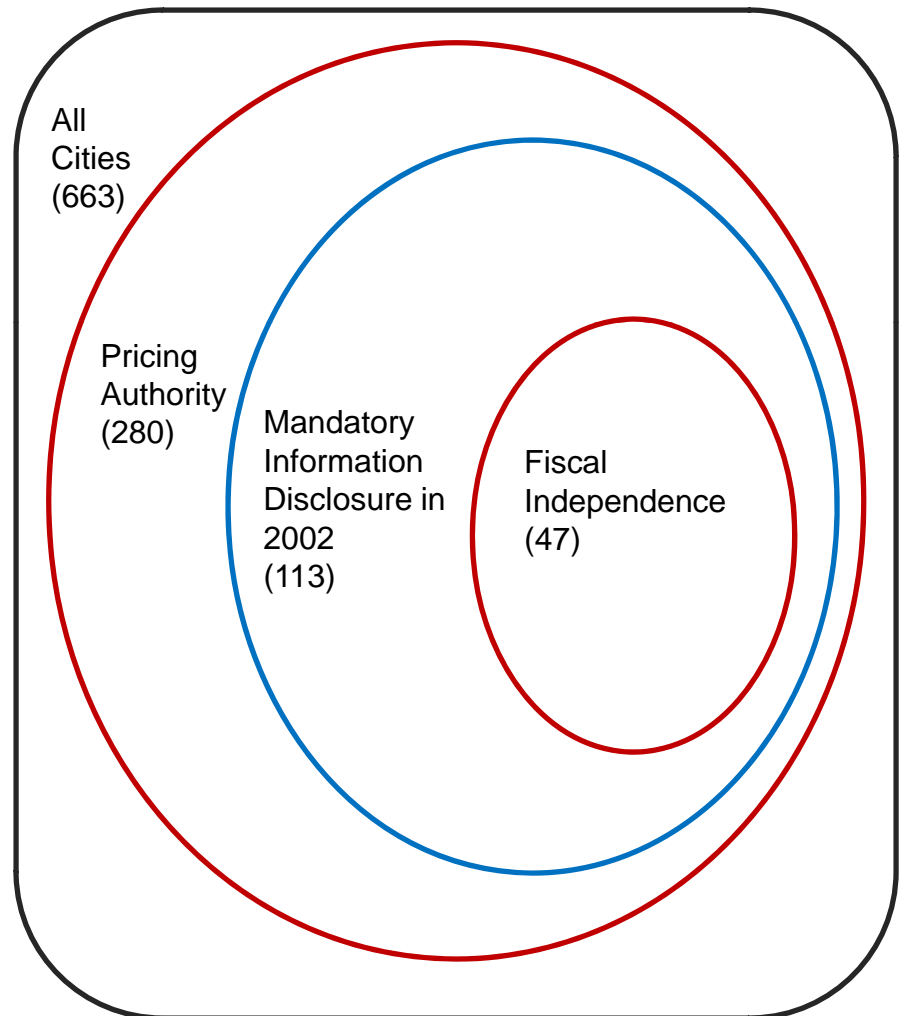
Chinese Water Services

Piped Water Supply Coverage and Wastewater Treatment Rate, 2004



Spatially Heterogeneous Policies

- Pricing authority:
 - Municipality; prefecture; six (1.5%) counties
- Fiscal independence
 - Provincial capitals
 - Sub-provincial cities
 - Special economic zones and coastal cities
- Mandatory Disclosure Policy (report *up*)
 - Size: large and medium



Empirical Model

- Dependent variable (sector performance)
 - Piped water supply coverage (% pop covered)
 - Wastewater treatment rate (% collected ww treated)
- Policy variables of interest: (dummies)
 - Pricing authority (municipalities, prefectures and 6 pilot counties)
 - Information disclosure (large and medium size)
 - Fiscal independence (provincial capitals, sub provincial level cities, coastal cities and special economic zones opened to foreign investment)

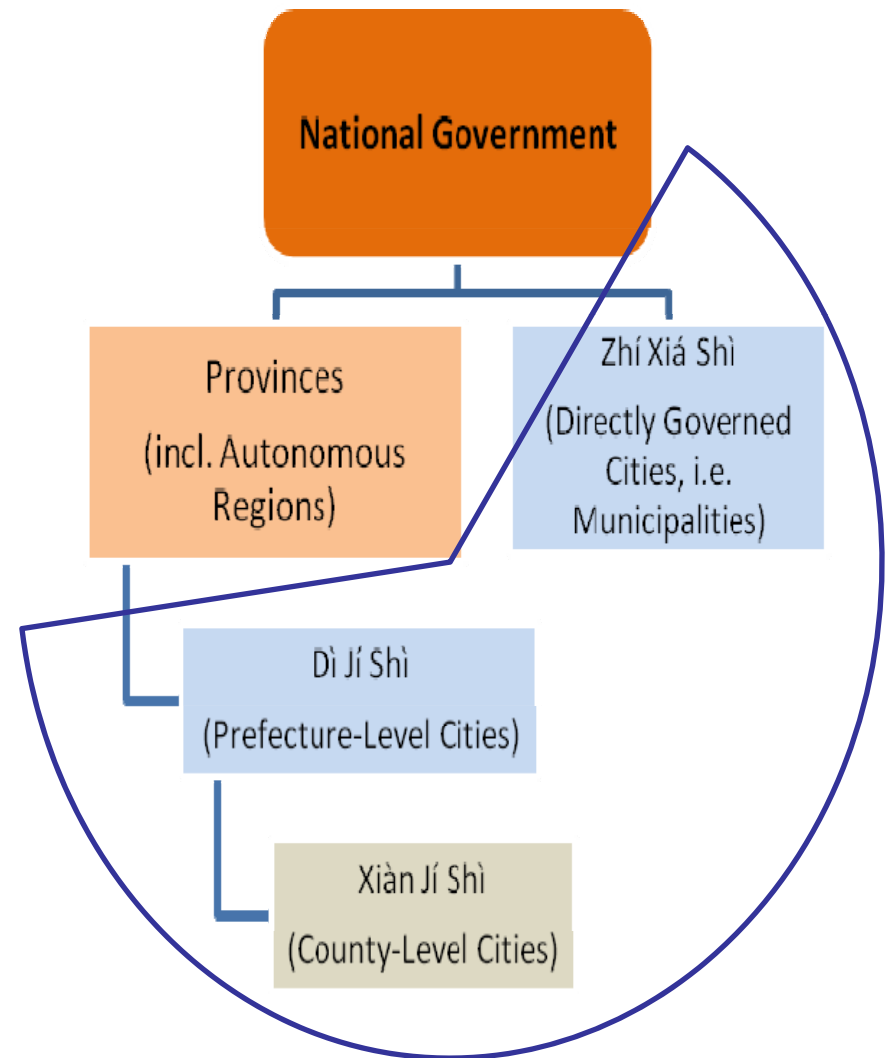
Model (con't)

- Control variables
 - Total gov't expenditure on water
 - Tariff charged directly to customers
 - Private sector participation
 - GDP
 - Population
 - Precipitation
- Robustness check
 - supply-demand type endogeneity
- Instruments
 - Total local expenditure on infrastructure
 - Grant from local gov't
 - Grant from central gov't
 - Private participation in other sectors
 - Population density

Data

- First comprehensive urban survey data
- all 663 cities in 2004
- 27% of national population
- 66% of national GDP

	median	mean	s.d.
Population (Million)	0.23	0.55	1.16
GDP (Billion Yuan)	1.95	10.34	45.42
GDP_PC (1000 Yuan)	8.17	10.9	10.5



Data (con't)

Policy	Piped water supply coverage						Wastewater treatment rate					
	yes			no			yes			no		
	#	mean	s.d.	#	mean	s.d.	#	mean	s.d.	#	mean	s.d.
Price Authority	280	0.89	0.16	381	0.85	0.19	275	0.38	0.29	367	0.25	0.32
Disclosure	113	0.91	0.11	547	0.87	0.18	112	0.51	0.24	532	0.27	0.31
Fiscal Independence	47	0.93	0.09	614	0.87	0.18	46	0.53	0.21	596	0.29	0.32
All	660	0.87	0.17				642	0.31	0.314			

Result I

Piped Coverage	OLS				IV			
Pricing Authority	.055*	(0.03)	.083*	(0.04)	.14*	(0.08)	0.15	(0.09)
Information Disclosure	.070**	(0.03)	.061*	(0.03)	.10**	(0.04)	.088**	(0.04)
Fiscal Independence	.11**	(0.05)	.073*	(0.04)	.29*	(0.15)	0.26	(0.19)
Tariff	0.01	(0.01)	0.01	(0.01)	-0.28	(0.18)	-0.28	(0.29)
Gov't Subsidy	4.06***	(1.16)	2.68**	(1.07)	0.47	(4.88)	-1.40	(3.58)
Privatization	0.00	(0.03)	-0.01	(0.03)	0.08	(0.22)	0.10	(0.23)
Constant	.93***	(0.03)	0.29	(0.26)	.92***	(0.07)	0.20	(0.37)
GDP	Quadratic		Spline		Quadratic		Spline	
POP	Quadratic		Spline		Quadratic		Spline	
Precipitation	Quadratic		Spline		Quadratic		Spline	
R2	0.30		0.34		.		.	
N	656		656		656		656	
* p<0.1, ** p<0.05, *** p<0.01; Province FE; s.e. in parenthesis; clustered at the province level								

Result II

Wastewater Treatment	OLS				IV			
Pricing Authority	.085*	(0.04)	0.02	(0.04)	0.09	(0.09)	0.003	(0.06)
Information Disclosure	.11**	(0.05)	.092*	(0.05)	.15**	(0.07)	0.08	(0.06)
Fiscal Independence	-0.02	(0.06)	0.01	(0.06)	-0.09	(0.29)	-0.06	(0.14)
Tariff	.11**	(0.05)	.089*	(0.05)	-0.25	(0.84)	0.33	(0.55)
Gov't Subsidy	1.66	(1.78)	2.26	(1.52)	7.59	(6.81)	5.57	(3.81)
Privatization	0.03	(0.05)	0.01	(0.05)	0.69	(0.79)	0.03	(0.44)
Constant	.20**	(0.09)	-.98**	(0.36)	0.15	(0.13)	-.96**	(0.36)
GDP	Quadratic		Spline		Quadratic		Spline	
POP	Quadratic		Spline		Quadratic		Spline	
Precipitation	Quadratic		Spline		Quadratic		Spline	
R2	0.40		0.43		0.27		0.42	
N	639		639		639		639	
* p<0.1, ** p<0.05, *** p<0.01; Province FE; s.e. in parenthesis; clustered at the province level								

Conclusion

- Decentralization **does** empower and enable the local government
- Local government puts **more (less)** effort into public goods with **less (more)** externality
- Central government policies **can** provide incentives (or threats) for local officials.
- Central policies should focus on public goods with **more** externalities

Look forward to your feedback!
Thank you!