

Why Participate? Understanding the Drivers of Citizen Complaints during China's Environmental Inspections

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Abstract

This paper identifies drivers of citizen engagement in the bottom-up monitoring program and how past contact with local bureaucrats influences future citizen participation in a dynamic setting. During environmental inspections, cities with low environmental performance at baseline receive more complaints per capita. However, citizens' complaints can not successfully pinpoint the dirtier polluters. Due to the knowledge-intensive nature of identifying pollution, if the central authorities wish to promote transparency and employ bottom-up monitoring as an information-gathering tool, additional training and resources may need to be supplied to individuals to ensure accurate and appropriate reporting. Exploiting the natural experiment of the two rounds, I observe a decrease in air-related complaints received in the lookback round if measured air pollutants return to baseline levels after the original round concludes. This suggests the long-term effectiveness of the environmental protection program is necessary for the central government to be perceived as responsive to environmental concerns raised by citizens. If the complaint channels cease to provide individuals with agency, the central government may not be able to reap the legitimacy benefits in the long run.

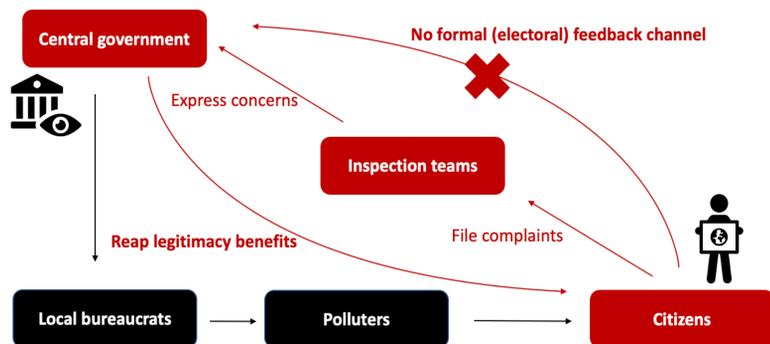
Introduction

Motivation: Why do citizens complain? Evidence from other settings?

Positive evidence on the effectiveness of community monitoring in democratic settings:

- Civil society has played an important role in the history of environmental enforcement in the U.S. (Beierle, 2010), inducing firms to go "beyond compliance" (Gunningham et al., 2004)
- Documented public support to mitigate air pollution (Stokes and Warshaw, 2017). Why would citizens participate in government-initiated citizen-based monitoring programs in authoritarian regimes?
- There is evidence that monitoring initiatives led to more citizen participation in local regulatory activities (Hsu et al., 2019; Grossman et al., 2017).
- Flato (2019) documents the limited desire for Chinese citizens to express concern for better environmental protection to their local bureaucrats.

Empirical setting: Drivers of citizen complaint



- Citizens are encouraged to file complaints by hotline or mail against polluters during the inspections.
- >135,000 complaints were investigated, 29,000 companies were punished, 18,000 officials were disciplined, and fines totaled 1.4 billion yuan.

Contribution: This paper examines this complaint channel, for citizens to demand local environmental performance and for the central government to gain legitimacy, in the Chinese setting.

Methods and Materials

What city characteristics determine the per capita complaints received?

- I check for four hypotheses: citizens' access to pollution information, local quality of life, local government efficiency, and baseline pollution level by estimating an ordinary-least-squares regression:

$$\text{Complaint}_i = \alpha_0 + \alpha_1 \text{Index}_i + \alpha_2 \text{City}_i + \varepsilon_i$$

What plant attributes predict whether or not a facility receives at least one complaint?

- I test for various factors: geographical location, revenue share, company age, ownership types, and oversight level.

$$L_n \left(\frac{P_i}{1 - P_i} \right) = \alpha_0 + \alpha_1 \text{City}_i + \alpha_2 \text{City}_i + \alpha_3 \text{Environ}_i + \varepsilon_i$$

Do citizens' behavior change, depending on plants' environmental performance?

- To examine if citizens reduced usage of the complaint channel based on the environmental effectiveness of the original round, I estimate an ordinary-least-squares regression:

$$\Delta_i = \alpha_0 + \alpha_1 \text{Rever}_i + \alpha_2 \text{City}_i + \alpha_3 \text{Season}_i + \alpha_4 \text{Year}_i + \varepsilon_i$$

Δ_i : the difference between total number of air and non-air related complaint in look-back and original round in a city divided over per million people.

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Results

What city characteristics are associated with the per capita complaints received during the environmental inspection?

- Cities with better pollution information disclosure systems receive a lower rate of complaints across all categories.

	Total	Air	Water	Soil	Noise	Ecology	Other
Daily violation	2181 (1.858)	2071* (1.164)	1052 (0.642)	0.294 (0.391)	0.455 (0.730)	0.535 (0.612)	0.199 (0.481)
Environ perform	-22.70** (9.262)	-15.09** (5.803)	-4.070 (3.201)	-6.778*** (1.951)	-5.762 (3.640)	-5.858* (3.049)	-7.362*** (2.398)
Autom monitoring	-11.55*** (2.746)	-6.400*** (1.720)	-2.050** (0.949)	-2.253*** (0.578)	-4.184*** (1.079)	-2.402*** (0.904)	-0.644 (0.711)
Complaints & rep	-1.119 (4.602)	-0.119 (2.884)	-1.357 (1.591)	-0.455 (0.969)	-0.180 (1.809)	-2.526 (1.515)	0.171 (1.191)
Emis of key ent	4.525 (3.864)	3.182 (2.421)	1.812 (1.335)	0.213 (0.814)	1.991 (1.519)	0.341 (1.272)	0.878 (1.000)
Environ impact assess	5.511 (3.846)	3.663 (2.410)	2.272* (1.329)	1.057 (0.810)	1.831 (1.511)	1.704 (1.266)	0.750 (0.996)
Observations	67	67	67	67	67	67	67
R-squared	0.427	0.424	0.320	0.439	0.340	0.333	0.273

- Cities with poor environmental performance at baseline receive a higher number of per capita complaints.

	Total	Total	Total	Total	Total
log(per capita)	41.69*** (14.70)	42.72*** (14.78)	45.91*** (15.20)	42.88*** (15.24)	43.63*** (15.14)
log(fixed asset inv)	-5.477 (9.510)	-13.28 (9.679)	-10.36 (9.595)	-9.939 (9.770)	-10.45 (9.802)
log(elec usage)	10.81 (6.578)	8.292 (6.545)	9.200 (6.619)	8.730 (6.659)	9.083 (6.669)
log(annual SO ₂ emi)	-1.452 (8.909)	4.972 (8.718)	3.532 (8.773)	3.428 (8.852)	3.337 (8.822)
log(annual dust emi)	3.196 (7.026)	1.976 (7.290)	4.362 (7.221)	6.312 (7.272)	5.468 (7.277)
baseline_SO ₂	0.507** (0.211)				
baseline_NO _x		1.099** (0.528)			
baseline_PM _{2.5}			0.374 (0.283)		
baseline_PM ₁₀				0.0636 (0.192)	
baseline_AQI					0.182 (0.250)
Observations	150	150	150	150	150
R-squared	0.252	0.244	0.231	0.222	0.224

What plant attributes predict whether or not a facility receives at least one complaint, controlling for city characteristics?

- A higher per-capita income level positively predicts receiving a complaint. But high baseline SO₂ does not predict a complaint.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
log(per capita)	0.44*** (0.12)											0.58** (0.26)
log(pop dens)		0.14* (0.08)										0.00 (0.15)
log(fixed asset inv)			0.12* (0.07)									0.02 (0.15)
log(elec usage)				0.03 (0.05)								-0.14 (0.11)
log(annual SO ₂ emi)					0.12 (0.08)							0.10 (0.16)
log(annual dust emi)						-0.07 (0.06)						0.10 (0.12)
log(dist to center)							-0.04 (0.06)					-0.03 (0.07)
revenue share city								0.28 (1.09)				0.21 (1.18)
company age									-0.01 (0.00)			-0.01 (0.01)
upper SOE										0.08 (0.12)		0.11 (0.15)
baseline SO ₂											-0.00 (0.00)	-0.00 (0.00)
Observations	1,420	1,420	1,420	1,405	1,420	1,420	1,429	1,094	1,098	1,429	1,258	932
Pseudo R ²	0.00811	0.00165	0.00162	0.000199	0.00127	0.000682	0.000328	4.70e-05	0.00136	0.000264	8.46e-08	0.0129

Do complaints change depending on the environmental effectiveness of the original round?

- I observe a decrease in air-related complaints in cities with higher levels of reversion to baseline pollution after the original inspection round, which suggests that citizens may update their beliefs about responsiveness.

	ΔAir	ΔAir	ΔAir	ΔAir	ΔAir	ΔNonair	ΔNonair	ΔNonair	ΔNonair	ΔNonair
log(per capita)	-11.94 (7.477)	-12.69* (7.577)	-12.05 (7.579)	-11.41 (7.429)	-12.10 (7.599)	8.909* (5.190)	9.188* (5.195)	9.659* (5.195)	9.859* (5.142)	9.537* (5.215)
log(fixed asset inv)	-0.897 (4.598)	0.0866 (4.652)	0.435 (4.617)	0.362 (4.527)	0.124 (4.620)	-7.039** (3.192)	-7.530** (3.189)	-7.232** (3.164)	-7.317** (3.133)	-7.452** (3.171)
log(elec usage)	2.674 (3.280)	3.398 (3.314)	2.892 (3.329)	2.483 (3.257)	2.969 (3.336)	-0.175 (2.277)	-0.335 (2.272)	-0.727 (2.282)	-0.850 (2.254)	-0.621 (2.290)
log(annual SO ₂ emi)	1.151 (4.176)	0.129 (4.347)	0.412 (4.209)	1.032 (4.117)	0.255 (4.209)	-2.460 (2.898)	-1.662 (2.980)	-1.551 (2.885)	-1.353 (2.849)	-1.728 (2.888)
log(annual dust emi)	1.106 (3.409)	0.149 (3.441)	0.286 (3.417)	0.331 (3.353)	0.398 (3.428)	1.685 (2.367)	1.876 (2.359)	2.002 (2.342)	2.015 (2.321)	2.065 (2.352)
Rever SO ₂		-0.219* (0.114)					-0.094 (0.0792)			
Rever NO _x			-0.104 (0.356)				-0.107 (0.244)			
Rever PM _{2.5}				-0.201 (0.203)				-0.150 (0.139)		
Rever PM ₁₀					-0.332** (0.140)				-0.177 (0.168)	
Rever AQI										-0.0836 (0.117)
Observations	130	130	130	130	130	130	130	130	130	130
R-squared	0.224	0.201	0.207	0.236	0.205	0.183	0.179	0.185	0.200	0.181

Discussion and Conclusions

How does baseline pollution level affect citizen complaints?

- Citizens are good at distinguishing the overall environmental wellness of the city but bad at identifying individual polluters.
- Policy: Citizen reporting should be viewed as a signal instead of an information-gathering tool due to the knowledge-intensive nature of detecting air pollution.

Are citizens' willingness to file complaints dependent upon the result of previous complaints?

- At the city level, per capita air-related complaints received in the look-back round will decrease if there is a reversion to the baseline pollution level for measured air pollutants after the original round ends.
- Policy: If complaint channels no longer grant citizens agency, the central government may not be able to gain the legitimacy benefits in the long run.

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