# Citizen complaints, regulator behavior, and air pollution emissions: Evidence from Texas

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PRELIMINARY AND SERIOUSLY INCOMPLETE

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## 1. Introduction

Every major environmental statute in the United States allows for citizen participation. Of particular interest for this research, enforcement agencies maintain web, phone, and mail hotlines through which citizens can submit complaints. Complaints often stem from odor, dust, visible industrial emissions, poor equipment maintenance, or unusual emissions and may or may not involve violations of environmental regulations. The conventional wisdom about citizen complaints is that they enhance regulatory effectiveness (and possibly regulatory efficiency) by bringing attention to problems undetected by costly regulatory monitoring. However, the extent to which environmental complaints impact the behaviors of regulators and facilities remains poorly understood.[1]

Our paper addresses this gap. Despite the prominent role for citizen complaints in domestic environmental policy and practice, existing research does not explore the determinants of complaints or their impacts in developed country industrial pollution settings. A few studies explore the determinants of citizen complaints and implications for pollution in developing countries where formal environmental regulations are absent or weak (Pargal & Wheeler 1996; Afsah et al. 1997; Dasgupta & Wheeler 1997; Dong et al. 2011). However, it is not clear that the results from this literature would inform industrial pollution under major environmental statutes in developed countries. Notably, citizen complaint systems in developed countries are designed to *complement* formal environmental regulation rather than *substitute* for it as in many developing countries.

We believe this is the first paper to systematically and comprehensively analyze the causes and consequences of citizen complaints for industrial pollution under a major environmental statute in the United States. We study these issues for three reasons. First, it is not

[1] Huang & Miller (2006) and Weersink & Raymond (2007) explore citizen complaints related to livestock facilities.

obvious that complaints influence regulator or facility behavior in practice. Regulatory agencies receive thousands of complaints of uncertain reliability, often from small groups of persistent complainers, and the majority may be unrelated to severe problems. Citizen complaints may also "crowd out" public monitoring and enforcement, as public agencies may prefer to devote scarce resources where citizens or other stakeholders are not especially active (Langpap & Shimshack 2010). Second, citizen complaints are fundamental mechanisms of accountability for governance, for both regulated entities and regulators themselves (Botero, Ponce, Schleifer 2013). Consistent with casual intuition, citizen complaints may increase regulated facilities' risk of inspection and sanction. However, large clusters of citizen complaints may also increase regulators' risk of unwanted attention from politicians and voters. Third, citizen complaint channels offer opportunities for "next generation compliance" tools that emphasize disclosure and other strategies to leverage community pressure to achieve more compliance with lower public resource outlays (Giles 2013). This issue may be unusually timely in light of reduced emphasis on federal Environmental Protection Agency (EPA) oversight of pollution monitoring and enforcement in the U.S.

Our paper makes three contributions. First, we explore correlates of citizen complaints using novel data from a policy-relevant setting Clean Air Act (CAA) setting. We characterize the nature, scope, and scale of environmental complaints for one important setting. We explore determinants of variation in complaints across space and time. Second, we provide the first study to systematically explore empirically the impacts of citizen complaints on regulator behavior in a large-scale developed country environmental context. We document the impact of complaints on the regulator agency's inspection and sanction activity. A motivating question is whether citizen complaints crowd in or crowd out public monitoring and enforcement. Third, we explore the

impacts of citizen complaints on facility behavior, either directly or indirectly through impacts on regulators' activity. We build on a small related law and economics literature, but go beyond present scholarship by focusing on everyday citizen complaints rather than on private advocacy group monitoring or rare citizen lawsuits.[2]

We first propose a conceptual framework for understanding the causes and consequences of citizen complaints that follows Botero, Ponce, and Shleifer (2012). Our key hypotheses are that increases in local area education, political activism correlates, and violations are associated greater citizen activity; that citizen complaints steer public monitoring agency resources and increase investigations (i.e. they crowd in public agency activity); and that complaints reduce pollution violations but only indirectly via changes in agency behavior. We analyze our hypotheses using a remarkably rich dataset on more than 50,000 citizen complaints filed with the Texas Department of Environmental Quality between 2003 and 2013. We combine complaint data with extensive facility-level establishment characteristics, emissions, compliance, enforcement, investigations, weather, and community characteristic data for the universe of all regulated point sources of air pollution operating in the state of Texas during our sample period. We take several empirical approaches, each with its own strengths and weaknesses as strategies for isolating causal relationships. Our most refined approach exploits variation in wind and rain for statistical identification, as these weather factors contribute to variation in observed complaints but plausibly do not directly influence regulatory and facility outcomes.

We find three preliminary results. First, complaints are positively correlated with county-level population, education, and CAA non-attainment status. Since the inclination to lodge complaints may increase with education (Botero, Ponce, Schleifer 2013), citizen activity may

[2] Langpap & Shimshack (2010) and Ashenmiller & Norman (2011) explore the impact of citizen litigation on enforcement agency behavior and targeted facilities' pollution outcomes. A nascent literature explores the impact of nonprofit group water quality monitoring on environmental compliance. See, for example, Grant & Grooms (2012).

represent an alternative mechanism for explaining the observed relationship between education and overall environmental quality (e.g., Kahn 2002). We do not find associations between air complaints and income and race. Second, we find that citizen complaints “crowd in” regulator inspections and notices of violation at the targeted facility but appear to “crowd out” regulator inspections and notices of violation at other facilities. That is, complaints appear to shift resource allocations. Third, we find suggestive evidence that citizen complaints reduce noncompliance at targeted facilities. However, facility compliance responses appear small and likely attributable to short-run increases in inspections rather than to direct effects of complaints. We currently find no effect on overall compliance in the county.

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