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Do environmental right-to-know laws affect markets? Capitalization of information in the toxic release inventory



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ABSTRACT

This paper investigates how information contained in the U.S. Environmental Protection Agency's Toxic Release Inventory (TRI) program, one of the largest environmental right-to-know programs, affects prices in the housing market. I use a strengthening of the reporting requirements for the chemical lead in 2001 as exogenous variation to test for housing price changes near existing firms who must now report. Using a difference-in-differences specification, I find that listing an existing firm in the Toxic Release Inventory lowers housing prices up to 11% within approximately 1 mile. The results suggest that housing market participants do capitalize into prices at least some information conveyed by the TRI program.

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Introduction

Public disclosure laws are designed to provide the public with information not normally included in the free exchange of goods and services. These “right-to-know” laws have been called for in many areas of the economy. As of 2008, New York City required all chain restaurants to disclose caloric content on restaurant menus with the intent to combat obesity by simply requiring that information be provided to consumers. This requirement has been expanded nationally by the Patient Protection and Affordable Care Act, even though several studies have found no evidence that caloric content on menus affects total purchased calories (Dumanovsky et al., 2011; Swartz et al., 2011). In California, Proposition 37, on the November 2012 ballot, would have required all genetically modified foods to be labeled as “GMO”: genetically modified organisms. Proponents argued that consumers have a right to know what they are eating. Opponents countered that the GMO label would frighten and mislead consumers, citing an American Medical Association report affirming the lack of scientific evidence differentiating GMO from non-GMO (Morisy, 2012). Understanding how consumers process information that they have a “right-to-know”, both on a detailed, continuous scale, like caloric content, and on a discrete scale, like a GMO label, is an important issue for policy makers in many areas.

Public disclosure laws have been an important component of environmental policy for several decades (Konar and Cohen, 1997). While right-to-know environmental regulations have roots in ethical, legal, and medical arguments,

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economists dating back to Ronald Coase (Coase, 1960) have argued that increased information on of the type and quantity of pollution can reduce deadweight losses. The “Coase Theorem” is generally agreed to maintain, in part, that with full information and no transactions costs, bargaining between the generator of an externality and those that bear the burden will result in an efficient outcome. Proponents of disclosure laws cite the spirit of Coase theorem, arguing that by using disclosure, pollution can be reduced using market-based incentives (as opposed to comparatively expensive command-and-control regulation) as polluting firms face pressure to abate from an informed public. Critics argue that disclosed information is not easily understood by the public, is either ignored completely or misunderstood, and comes at great cost to firms; arguments similar to those made by opponents of Proposition 37. The effectiveness of any disclosure policy hinges on how consumers and households use the disclosed information. Accordingly, understanding how information about environmental and neighborhood amenities influences household behavior remains an active area of research.¹

Perhaps the most prominent right-to-know law is the Emergency Planning and Community Right to Know Act (EPCRA), passed by Congress on the heels of the Union Carbide disaster in Bhopal, India.² EPCRA created the Toxic Release Inventory (TRI), which requires certain firms to report annual emissions of toxic chemicals, to provide transparency about the presence, type, and quantity of hazardous chemicals to the communities that were most likely to be impacted by their release. Policy makers designed the TRI partly based on the “market-based regulation” idea: if the EPA provides detailed, facility-level information on toxic chemicals and emissions to the public, firms will be incentivized to reduce the amount of pollution they produce via public pressure. The goal of pollution reduction would be hard to attain if households do not make use of the data provided in the TRI. This paper aims to further the understanding of how information is utilized by the households most likely to be impacted by toxic releases.

Since the inception of the TRI, toxic emissions have fallen in the United States. For example, from 1989 to 1999, emissions in the U.S. have fallen 40%.³ The EPA reports that disposal and releases of covered chemicals have fallen approximately 30% between 2001 and 2010 (U.S. Environmental Protection Agency, 2010). However, evidence that the public internalizes information on toxic emissions, for example in the housing and stock markets, is mixed.⁴ Accordingly, it is difficult to claim that emissions are falling as a result of public pressure if it is unclear that households and investors respond to emissions data.

In light of the mixed evidence on household reaction to emissions data, the goal of this research is to determine whether households react to information content in the TRI not directly related to emissions. Part of the original intent of EPCRA was to inform households about the presence of toxic chemicals in their communities and to prepare them for the possibility of an accidental release of hazardous materials. Site reporting requirements to the TRI are based upon onsite quantities of reportable chemicals. Having a nearby firm listed in the TRI informs households of the quantity and types of emissions as well as the threat of a potential accidental spill of chemicals. If households are more sensitive to living near TRI facilities for fear of catastrophe rather than chronic exposure to toxic air emissions, evaluating the impact of the TRI program solely on emissions data might be insufficient. Furthermore, if there is significant stigma or public pressure associated with exceeding the reporting thresholds for the TRI, the measured reduction in aggregate emissions seen in the data may be a result of numerous firms' incentives to reduce their chemical usage to just below the reporting requirements.

Generally speaking, the existing literature on TRI emissions valuation can suffer from two empirical problems.⁵ First, basic cross-sectional hedonic analyses that measure the implicit price for emissions or TRI site proximity could be subject to omitted variables bias if unobserved housing or neighborhood quality is spatially correlated with TRI firm locations. Second, panel data models that try to difference away this unobserved heterogeneity might produce a corresponding decrease in meaningful variation in the data. Cross-sectional variation in emissions might be especially salient to households, whereas year-to-year changes in emissions might not be detectable or important to residents.⁶ These issues might produce insignificant estimates of the coefficient on TRI site proximity or emissions exposure in a typical hedonic property value model, leading to the conclusion that housing markets do not capitalize information in the TRI.

To help clarify the effect of information in the TRI on households, I use a discontinuous change in the reporting threshold for the chemical lead to design a quasi-experimental empirical model. In 2000, the EPA lowered the reporting requirement for manufacturing or possessing “Persistent, Bioaccumulative and Toxic” chemicals (PBTs). In general, these thresholds were reduced from thousands of pounds per year to between ten and one hundred pounds per year. In 2001, lead and lead compounds were designated as PBTs and the threshold for reporting was lowered accordingly, from ten thousand pounds per year to one hundred pounds per year. As a result, firms that were using more than the new threshold but less than the old threshold were no longer exempt from TRI reporting. If housing market participants utilize the information provided in the TRI program, it is likely that these shocks to information sets will have corresponding effects on housing prices.

¹ Examples exist for several different environmental disamenities. Gamper-Rabindran et al. (2011), Mastromonaco (2014) and Gayer et al. (2000) for Superfund sites, Hallstrom and Smith (2005) for potential hurricane damages, Linden and Rockoff (2008) for crime risk, Pope (2008) for airport noise, among others.

² EPCRA is also known as the “Superfund Amendments and Reauthorization Act”.

³ See Bui and Mayer (2003) for discussion.

⁴ See Hamilton (1995), Khanna et al. (1998), Bui (2005), Bui and Mayer (2003), Banzhaf and Walsh (2008) and Konar and Cohen (1997).

⁵ One notable exception is Sanders (2014), who also employs a difference-in-differences estimator.

⁶ In a study of the effect of Superfund sites on housing prices, Kohlhase (1991) concludes that the market reacts to the presence of, but not the severity of contamination at, Superfund sites.

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