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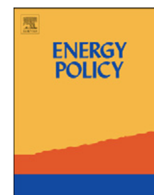

Different rays of sunlight: Understanding information disclosure and carbon transparency

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HIGHLIGHTS

- ▸ This article evaluates the Carbon Disclosure Project and state carbon reporting requirements.
- ▸ Evaluation is conducted with propensity score matching and difference-in-differences.
- ▸ State Disclosure Programs fail to lead power plants to reduce carbon dioxide emissions.
- ▸ The Carbon Disclosure Project leads to decreases in carbon emissions and electricity output.
- ▸ Information disclosure and transparency may be important part of policy mix but have limitations.

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ABSTRACT

This study assesses the effectiveness of two types information disclosure programs – state-based mandatory carbon reporting programs and the voluntary Carbon Disclosure Project, which uses investor pressure to push firms to disclose carbon emissions and carbon management strategies. I match firms in each program to control groups of firms that have not participated in each program. Using panel data methods and a difference in differences specification, I measure the impact of each program on plant-level carbon emissions, plant-level carbon intensity, and plant level output. I find that neither program has generated an impact on plant-level carbon emissions, emissions intensity, or output. Placing this study in contrast with others that demonstrate improvements from mandatory information disclosure, these results suggest that how information is reported to stakeholders has important implications for program effectiveness.

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1. Introduction

The use of information disclosure programs has been increasingly prevalent in order to improve risk management and allow for more cost-effective private-market and legal forces to replace the heavy hand of government intervention. A variety of examples include lead paint disclosures, toxic emissions data, drinking water quality notices, eco-label notices, health, hygiene, and nutrition labeling, surgeon general's warnings, and financial market data provision. Agricultural products increasingly are labeled with information regarding the origin or the product and organic labeling. Colleges, universities, and hospitals must disclose a variety of statistics and performance metrics. Increasingly, information provision and product labeling has come to represent a common way of attempting to provide consumers and investors with greater choice, without directly mandating behavioral changes from regulatory targets.

As industrialized nations prepare to deal with climate change policy, it has become increasingly important that quality greenhouse gas emissions data are collected from firms. The aggregation of this information is the first step towards improved management of greenhouse gases. In addition, the transparency of firm operations and the reduction of information asymmetry between firms and their investors and consumers may provide a vehicle for free-market environmental policy and the impetus for improved management and increased efficiency of greenhouse gas operations.

A variety of information disclosure programs have arisen on the national, state, and international levels. Since 1993, Wisconsin has mandated greenhouse gas emissions disclosure from large emitters of carbon dioxide (EPA, 2009). Over time, the number of states requiring this disclosure has increased to 18 states, and as of January 1, 2010, a rule exists to require national greenhouse gas reporting from all large emitters. Additionally, the U.S. Securities and Exchange Commission requires the disclosure of

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climate change related risks, as of February 10, 2010. Voluntary initiatives have proliferated as well. The Department of Energy's 1605b program encourages firms to voluntarily report carbon emissions to the federal government. The Carbon Disclosure Project (CDP) is a private, non-profit voluntary initiative designed to improve transparency between firms and investors, and encourage improved management of greenhouse gases by firms.

Because research regarding the effectiveness of information disclosure programs has demonstrated mixed results, increased attention has turned towards determining what makes some information disclosure programs more effective than others, or what makes information disclosure programs effective in certain circumstances (Bae et al., 2010). Information disclosure programs can collect different types of information, use a variety of tools to disseminate information, and can be sponsored by government, industry groups, or non-governmental organizations (Darnall et al., 2009). As industrialized countries seek to address greenhouse gases, they are faced with an increasingly broad array of policy tools and approaches to policy that can be used to improve the governance of greenhouse gases. Evaluating policy experiments and institutional arrangements can lead to an improved understanding of institutional design and how to solve collective action problems (Ostrom, 2005).

Using a panel of plant-level data, this research seeks to evaluate a private voluntary (the CDP) and a public mandatory approach (State Reporting Requirements) to the disclosure of carbon dioxide emissions. This research will help contribute to the debate regarding the effectiveness of information disclosure programs, while helping to shed light on the possible tradeoffs between various designs of information disclosure approaches. The broader implications of this research may help policy-makers and researchers better understand the tradeoffs of voluntary and mandatory environmental policy, and an understanding of the extent to which information disclosure programs can play a role in the mix of policy tools used to address climate change.

This seeks to provide insight regarding the effectiveness of information disclosure programs on carbon dioxide and electricity generation, which may have different incentives and institutional arrangements than programs to address toxics or other environmental pollutants. In addition, this research tests two different approaches to information disclosure – a government mandated reporting mechanism, and a voluntary NGO-led reporting mechanism. The findings of this research – that the CDP seems to produce a modest decrease in plant level carbon emissions and electricity output while state reporting requirements have no impact – contributes to a range of findings in the literature that have demonstrated cases where information disclosure programs are effective and ineffective. I explore this diversity of results in the context of the structure of information disclosure program design.

2. The success and failure of information disclosure programs

Information disclosure programs can be run by government, as a mandatory or voluntary reporting program, but are increasingly designed as a form of 'civil regulation' (Murphy and Bendell, 1999), where civil society actors pressure firms to establish and adhere to environmental and social norms and standards. The institutionalization and standardization of information disclosure allows stakeholders to demand accountability and certain performance levels, rewarding strong performers and exerting pressure on poor performers or non-disclosers (Fiorino, 2006). Information disclosure programs evolved as a response to the challenges of implementing increasingly expensive command and control regulatory policy (Bae et al., 2010). Regulatory innovation, including a move to market based mechanisms, voluntary programs, and information disclosure programs have been thought of as ways to improve environmental outcomes using less costly and coercive policy tools (Konar and Cohen, 1997).

Information disclosure has been hypothesized to work via several mechanisms. Most traditionally, information disclosure programs promote increased transparency that allows markets to react to differences across firm behavior. Investors and shareholders may perceive environmental behavior as an indicator of firm risk management, or more directly as a financial liability (Hamilton, 1995; Khanna et al., 1998; Kim and Lyon, 2011b; Konar and Cohen, 1997; Patten, 2002). Improved information disclosure allows investors and shareholders to gauge risk and respond accordingly by rewarding or punishing firms in the stock market. Evidence for this is mixed. Some studies have concluded that firms with large releases experience decreases of stock prices (Hamilton, 1995, 2005; Khanna et al., 1998; Konar and Cohen, 1997; Shapiro, 2005), and subsequently reduce emissions (Grant, 1997). In contrast, others have found that information disclosure was ineffective (Grant and Jones, 2004; O'Toole et al., 1997) and that changes in emissions may be due to regulatory changes (Bui, 2005) or community characteristics (Hamilton, 2005; Shapiro, 2005).

Improved information disclosure can allow consumers to make choices based on the environmental performance of firms or the environmental labeling of products (Delmas et al., 2010; Shimshack et al., 2007). Firms may gain a marketing advantage through improved environmental performance or by participating in a voluntary environmental program. Evidence in this area is also mixed. Information provision can improve product quality (Brouhle and Khanna, 2007) and lead to "greener" fuel mixes in the electricity industry (Delmas et al., 2010). However, it has been difficult to distinguish the advantage gained by environmental performance from the advantage gained from environmental marketing, which has been demonstrated to lead to a reputational, financial, and competitive advantage for firms (Miles and Covin, 2000; Prakash, 2002).

An alternative mechanism for the success of information disclosure programs suggests that information disclosure targets internal stakeholders, such as employees, and leads firms to pursue cost-effective environmental improvements (Cerin, 2002). The process of information disclosure can allow a firm to analyze its activities, seek out means for improvements in efficiency, and improve management techniques; however, the degree to which information disclosure leads to improvements in behavior is related to the level of embeddedness of the information for both the user of the information and the discloser (Weil et al., 2005). This hypothesis suggests that the mechanism for disclosure plays an important role in the success of a disclosure program. If firm managers, investors, and consumers are unable to easily access and understand the disclosure of emissions, firm behavior is unlikely to change (Bae et al., 2010).

Significant research has been conducted in the area of information disclosure programs, yet much remains to be learned regarding the design characteristics of information disclosure programs and how these promote or hinder performance (Stephan, 2002). In particular, the comparative performance of different designs of information disclosure programs is not well understood.

3. Theory and contributions of this research

Recent research has focused on the design of information disclosure programs to understand what makes information disclosure programs more or less successful. Increasing evidence

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