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ANALYSIS

Why do manufacturing facilities introduce environmental management systems? Improving and/or signaling performance[☆]

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ABSTRACT

In this paper we explore the motivation for the introduction of environmental management systems, and their certification. A distinction is drawn between their role in bringing about better compliance or improved performance, and as external indicators of good environmental practices to both other market participants and regulatory authorities. Drawing upon a database of approximately 4000 facilities in seven OECD countries, empirical evidence is found for the role that both factors play in encouraging the adoption and certification of EMS's, but that the relative importance of different factors varies according to facility size.

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1. Introduction

Environmental management systems (EMS's) are usually viewed as playing a causal role in bringing about either: a) improved environmental performance and compliance; or, b) comparable environmental performance and compliance at

lower cost (Potoski and Prakash, 2005a). Indeed, both regulators and buyers are increasingly concerned about the quality of facilities' environmental management. The most widespread EMS standard (ISO 14001) mandates the introduction of an explicit corporate environmental policy, including: the identification of the environmental impacts of its activities;

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the identification of legal and other requirements relating to its activities; the establishment of an audit and review system; and procedures to rectify any shortcomings identified. Implemented effectively, such measures can help facilities improve their environmental performance. For this reason examples of “management-based regulation” are increasingly common, with the implicit assumption that good management will lead to good performance (Benneer, 2007).

However, the widespread view that EMS's are a reflection of “better” environmental stewardship has also raised the possibility that certified EMS's serve as a signaling device, informing others that they are managing their environmental impacts efficiently.¹ Since the quality of environmental management is not readily observable, this is an area characterized by strong information asymmetries.² As such, it can be a good strategy for facilities to provide information on their environmental management practices to both regulators and buyers. In this paper, we argue this is one of the reasons why facilities decide to implement an EMS.³

In the event that the primary motivation for the introduction of an EMS relates to the role that it plays in bringing about improved environmental performance, the motivation is internal to the facility. In the event that the primary motivation relates to the perceptions of others, the motivation is external, with the certified EMS acting as a “signal” to others. It is important to note that unless EMS brings about improved environmental performance, the latter motivation will not be sustainable. Indeed Spence (1973) argues that a strategy based upon signaling which provides misleading information (i.e. does not reflect superior environment management in this case) will not be viable in the longer-term.

In this paper we explore the role that certified EMS's play as a signaling device toward regulators and potential buyers through the use of a database covering over 4000 manufacturing facilities. The database is unique in that it provides information on those facilities which have not introduced EMS's, those which have done so, but not certified them, and those which have done so and certified them by third parties. The distinction between these three groups is important since the motivations for implementing an EMS may be largely internal, while the motivation for certification may be external. As King et al. (2006) point out, collapsing these two decisions in the analysis can be misleading.

The paper provides a number of advances on previous literature. Firstly, the database covers a broad range of facilities, with observations from facilities with more than 50 employees in all manufacturing sectors in seven OECD countries (France, Norway, Hungary, Germany, Canada, United States, Japan). This allows for much greater variation in the data, particularly the policy variables. Since regulatory

frameworks differ significantly by country, sector, and facility size the sample allows for a more robust assessment of the impacts of policy variation. (See Johnstone et al., 2007a for a comparison of policy frameworks across these vectors.) In addition, data on market structure and other factors which influence EMS adoption and certification is included in the analysis.

However, the most important advance on previous work is the rich characterisation of the environmental policy framework, including general policy measures as well as policy incentives which are targeted directly at EMS adoption and certification. In particular, relative to previous literature (King et al., 2006; Toffel, 2005; Terlaak and King, 2006; King et al., 2006) we are able to examine whether the EMS certification decision serves as a signal to public regulators, and not just private sector supply chain partners. For instance, Potoski and Prakash (2005a) estimate the impact of ISO certification on compliance with regulations, but not whether a reduction in regulatory scrutiny is an incentive to certify an EMS. To the extent that policymakers come to see EMS's as a reflection of good environmental performance, an understanding of the role of regulatory “signaling” as a motivation for their adoption and certification becomes increasingly important.

Overall, our results provide support for the view that in addition to their perceived role in bringing about improved environmental performance, facilities implement and certify EMS to signal to others in the market, particularly when there is significant potential for asymmetry of information between the facility in question and those that they are trying to signal, confirming findings reported in Terlaak and King (2006). In addition, we find strong evidence that certification serves as a signal to regulatory authorities, although the intended recipients of the signal appear to differ by facility size.

The remainder of the paper is organized as follows. Section 2 presents some theoretical arguments as to why firms decide to implement EMS. Section 3 describes the data set and provides descriptive statistics. Section 4 presents our estimation strategy and provides the results. The last section concludes and presents some policy implications.

2. Conceptual framework and principal hypotheses

As noted above, the introduction of an EMS involves defining a set of formal environmental policies, goals, strategies and administrative procedures for improving environmental performance. However, one should keep in mind that implementing an EMS involves the adoption of a set of practices rather than achievement of a certain level of environmental performance. The emphasis is on the process rather than on actual performance.

Facilities may decide to implement an EMS for the benefits it brings in terms of improved environmental management, and ultimately environmental performance. The quality and even presence of environmental management systems may not be observable to those outside the facility. However, certification of an EMS is public, and as such facilities may choose to certify their EMS in order to communicate the existence of a recognised environmental management system. In the remainder of this section, we discuss the

¹ For a review of the literature on signaling see Riley (2001).

² See Terlaak and King (2006) for a discussion related to ISO 9000.

³ According to the European Commission, ‘An EMS is a problem identification and problem solving tool that provides organizations with a method to systematically manage their environmental activities, products and services and helps to achieve their environmental obligations and performance goals.’ http://europa.eu.int/comm/environment/emas/about/enviro_en.htm accessed 4/01/2006.

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