

Is a voluntary approach an effective environmental policy instrument? A case for environmental management systems

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Abstract

Using Japanese facility-level data from an OECD survey, we estimate the effects of implementation of ISO14001 and publication of environmental reports on the facilities' environmental performance. While most previous studies focused on an index of emissions toxicity, this study examines three areas of impacts, none of which have been explored in the literature: natural resource use, solid waste generation, and wastewater effluent. The study is also unique in that the effectiveness of ISO14001 is considered in relation to environmental regulations. Our findings are summarized as follows. First, both ISO14001 and report publication help reduce all three impacts; the former appears more effective in all areas except wastewater. Second, environmental regulations do not weaken the effect of ISO14001. Third, assistance programs offered by local governments—a voluntary approach—promote facilities' adoption of ISO14001. These findings suggest that governments can use command-and-control and voluntary approaches concurrently.

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1. Introduction

Governments in many countries enforce environmental regulations by imposing qualitative or quantitative limits on emissions or by requiring facilities to adopt specific abatement technologies. This “command-and-control” approach has been criticized as being somewhat heavy-handed, inflexible, and cost-ineffective. Economic incentives such as pollution taxes or emission trading have distinct advantages over the

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command-and-control approach in terms of their cost-effectiveness. Because of opposition from manufacturing sectors and industry associations, however, their introduction has been politically fraught and difficult to achieve. In the face of limitations to government regulations and economic incentives, policymakers have attempted to encourage facilities to take voluntary action. The voluntary approach is recognized as being more flexible, effective, and less costly than the traditional approaches.

Recently, a variety of voluntary environmental actions are adopted at the “facility¹” level. One voluntary action is for facilities² to introduce an environmental management system (EMS).³ Typically, the EMS consists of policymaking, planning, and implementation and review of the environmental policies, all of which are intended to help facilities reduce the environmental impacts of their operations. Certified EMSs such as the ISO14001 standard and the EU Eco-Management and Audit Scheme (EMAS) are routinely practiced, especially in the automobile industry. Since 1996, major US and Japanese auto manufacturers, including Ford, General Motors, and Toyota, have implemented certified EMSs and require their suppliers to do the same. European carmakers such as Daimler-Benz and Volvo demand that their suppliers demonstrate certifiable implementation of an EMS. The trend now goes beyond the automobile industry. For example, major high-tech and computer companies such as Hewlett-Packard and Motorola expect suppliers to have achieved ISO14001 registration.

In response to the rapid growth in the number of EMS-certified facilities, researchers have turned their attention to what determines the adoption of certified EMS and its effectiveness on environmental performance. For example, using data on Japanese manufacturing firms, Nakamura et al. [18] showed that the adoption of ISO14001 is influenced by firm size, the average age of firm employees, export ratio, and debt ratio. Darnall [7] provided evidence that an early uptake of ISO14001 is due to greater regulatory pressure. Examining German manufacturing facilities, Ziegler and Rennings [26] found that facilities implement certified EMS to enhance their corporate image.

Past studies are not necessarily in agreement on the effectiveness of certified EMS.⁴ Potoski and Prakash [19] and Russo [21] provided evidence that ISO14001 helps US firms reduce their environmental impacts. On the other hand, Ziegler and Rennings [26] found that EMS certification does not significantly affect environmental innovation and abatement behavior at German manufacturing facilities. Using UK data, Dahlström et al. [6] showed that neither ISO14001 nor EMAS has a positive effect on compliance with environmental regulations.⁵

Besides EMS, publicly available environmental reporting is another important voluntary action. Reports inform investors and consumers about the facility’s products and environmental performance and thus may motivate the facility to decrease its environmental impacts or develop innovative approaches to reducing emissions. Publication of reports has not been examined in past studies as thoroughly as EMS. One of the very few studies that dealt with report publication is Anton et al. [2], but they focused on the effect of comprehensive environmental practices, not on the effect of report publication per se. Comprehensiveness was measured as the number of environmental practices adopted by the facility, one of which was report

¹“Facility” refers to plant. We use “facility” rather than plant since an OECD survey, the data source of this paper, uses the word, facility. Note that a firm can have multiple facilities.

²This study focuses on facilities for three main reasons. First, “facility” is an appropriate unit to analyze the effects of EMS, since it is implemented at the facility level. Second, the applicability of environmental regulation differs with the location of facilities. A firm may consist of multiple facilities, on which different environmental regulations may be imposed. Third, the OECD survey that is the data source of this paper specifically targets facilities.

³Coglianesse and Nash [4] define an EMS as “a formal set of policies and procedures that define how an organization will manage its potential impacts on the natural environment and on the health and welfare of the people who depend on it.”

⁴Besides implementing EMSs, facilities can also take voluntary action by participating in government-initiated voluntary programs. The effect of participation in a voluntary program is also inconclusive. Welch et al. [23] found that participants in the Energy’s Climate Wise program did not significantly improve their environmental performance. Khanna and Damon [16] found that participants in the 33/50 Program reduced emissions more than non-participants.

⁵Andrews et al. [1] provided two possible scenarios where adopting EMS may remain ineffective. In the first scenario, a facility with high environmental performance implements EMS while retaining its pre-existing management and committing to no additional practice. Another scenario might be where a low-performing facility implements EMS to satisfy customer demands or to improve its public image but without making any actual change in performance.

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