

**Environmental Management and Performance in Firms and
Facilities: Comment**

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Papers by Henriques, Sadorsky and Kerekes (HSK) and by Johnstone, Glachant, Sarravalle, Riedinger and Scapecchi (JGSRS)

both provide detailed analyses of the determinants of certain environment-related performance variables.

HSK use as dependent variables

- (1) EMS (ISO 14001, EMAS) used or not**
- (2) Certified EMS used or not (facilities with EMS only)**
- (3) Person in charge of environmental issues exists or not**
- (4) Number of environmental practices used**

JGSRS use as dependent variables

- (5) Performance and action indicators in Air Pollution**
- (6) Performance and action indicators in Water Pollution**
- (7) Performance and action indicators in Solid Waste**

Also EMS is used as a possible determinant of (1)-(3)

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Econometric issues

HSK use the facilities with EMS to estimate the second probit model on “certification of EMS” decision using a selection bias term.

This might result in a potential estimation bias (due to a truncated normal distribution?). Using the entire sample of facilities might be needed.

It is likely that some of the factors used as explanatory variables as well as some omitted variables affect both EMS decisions and environmental performance and action variables.

It is then appropriate that JGSRS consider simultaneous issues in some of their estimation procedures (e.g. bivariate probit regressions).

It is also interesting to compare EMS probit results by HSK with EMS bivariate probit results by JGSRS to see the potential extent of this simultaneity.

We see that the variables FIRMQUOT, INSPFREQ and VOLAGR are significant with the same signs in both studies.

This is reassuring.

The OECD database used in the current studies:

Each observation represents a manufacturing facility, and the sample contains multiple facilities of the same firms.

Then, for some statistical processing it might be important to view some of the observations in the sample to be correlated.

Most environmental performance measures are appropriately measured at the facility level.

But most of the financial performance variables are measured more accurately and typically measured only at the firm level.

Certain variables, e.g. R&D, advertising/marketing, might also be viewed as firm-level variables budgeted for by the firm's head office.

If involvement of firms' high level executives is important for their environmental achievement, we need to relate facility-level results to the firm-level performance.

The present database contains information about the state of EMS as well as environmental performance and actions. Thus it is possible to measure the effect of EMS on performance.

This is valuable information since implementation of EMS implies the process is in place but does not necessarily guarantee the final product (environmental performance).

These two papers suggest that the effects of public policies to induce firms to adopt environmental actions such as EMS are quite complex.

For example, HSK find that:

“public authorities” has negative impact on adoption of EMS and adoption of environmental practices;

but

“inspection frequencies” encourage adoption of env. practices

How should we interpret these results?

Perhaps firms can cope with more predictable external pressures (e.g. inspections) better. Firms can understand the specific objective of such environmental inspections and implement appropriate routines to deal with them.

**This is consistent with JGSRS's finding that:
“inspection frequencies” improves performance/actions;
EMS improves performance; perceived policy stringency
important but instrument choice matters less**

These result seem to suggest that:

**effective implementation of environmental actions need some
form of policy intervention (voluntary actions alone probably
not enough, consistent with earlier empirical results, e.g.
Nakamura et al. (2001), Takahashi et al. (2001));**

**Such policy intervention instruments may have to be compatible
with firms' organizational tendency to prefer routine procedures
to meet environmental requirements.**

In this regard, the organizational structure of environmental management within firms may be important in their corporate greening processes.

One measure of such a structure is bureaucratization. E.g. formalization, centralization and professionalization are three dimensions of bureaucratization. Firms' managers can typically affect these aspects of their firm organization.

Takahashi and Nakamura (forthcoming) find that, in case of large Japanese firms, bureaucratization of environmental management generally has a positive relationship with corporate greening and that the presence of one or two of the three dimensions of bureaucratization may be sufficient for corporate greening to implement certain greening measures.

**For example, suppose firms sequentially follow the three stages of environmental management processes (Hart (1995)):
(1)pollution prevention stage, (2)product stewardship stage,
and (3)sustainable development stage.**

Bureaucratization helps firms to achieve ISO 14001 EMS when they are in the first pollution prevention stage. But EMS, in turn, may not be very effective when firms are in the second or third stages. EMS often can't deal with the types of quick changes in company policies and strategies.

Examples.

Even though ISO14001 as a tool of EMS is supposed to monitor the processes of a firm's business operations for environmental purposes, our results suggest that the types of process of firm business operations ISO14001 can deal with might be limited to those that do not involve much change.

In fact, the managers of a few Japanese firms claim that ISO 14001 EMS does not function well when a company introduces a new production system or adopts a fast-paced corporate management system. For example, when a factory of Canon Corporation introduced an innovative cell-production system, EMS appeared to be unfit for the situation where trial and errors are usual.

Sony institutes EMS only at the plant level, not at the corporate level, because the corporate structural changes are too frequent to accommodate possible corresponding changes of EMS. Different anecdotal evidence of inappropriateness of formal EMS in certain situations concerns innovation.

An environmental manager of a chemical product company claims that developing a new product utilizing recycled content requires a task-force team that is separated from EMS because it needs concentrated efforts by specialists.

Another environmental manager of an electronic company says that the R&D department carries out technological development related to environmental protection, EMS has its role in standardizing the developed technology and R&D and EMS have different tasks. (Takahashi and Nakamura, forthcoming.)

References

Takahashi and Nakamura, “Bureaucratization of Environmental Management and Corporate Greening,” *Corporate Social Responsibility and Environmental Management*, forthcoming

Takahashi, Nakamura, van Kooten and Vertinsky, “Response of Canadian Industry to Climate Change: Is It up to the Kyoto Challenge?,” *J. of Env. Mgmt.* 63, 2001, 149-161.

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