



Eco-control: The influence of management control systems on environmental and economic performance

Jean-François Henri *, Marc Journeault

École de Comptabilité, Université Laval, Québec (Qc), Canada G1K 7P4

École de comptabilité Faculté des sciences de l'administration Pavillon Palasis-Prince, local 4226 2325, rue de la Terrasse Québec (Québec), Canada G1V 0A6

A B S T R A C T

Eco-control is the application of financial and strategic control methods to environmental management. In this study, we investigate to what extent eco-control influences environmental and economic performance. Using survey-data from a sample of Canadian manufacturing firms, the results suggest that eco-control has no direct effect on economic performance. A mediating effect of environmental performance on the link between eco-control and economic performance is observed in different contexts. More specifically, eco-control indirectly influences economic performance in the context of (i) higher environmental exposure, (ii) higher public visibility, (iii) higher environmental concern, and (iv) larger size. This study contributes to the management accounting literature by providing insight into the roles and contributions of management accounting in the context of sustainable development.

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Introduction

Over the past centuries, industrial development has brought immeasurable wealth and prosperity while also causing unintended ecological degradation such as global warming, ozone depletion, deforestation and desertification, declining biodiversity, and toxic waste (Shrivastava, 1995). Although organizations play a major role in causing and potentially controlling ecological problems, they could also benefit from cost reductions through ecological efficiencies, the development of green markets and first-mover advantage, better community relations, and improved image (Hart, 1995; Porter & Van der Linde, 1995; Shrivastava, 1995). Environmental management accounting (EMA) helps firms work to attain those potential benefits and to face their environmental responsibilities (Schaltegger & Burritt, 2000).¹

* Corresponding author. Tel.: +1 418 656 7737; fax: +1 418 656 7746.
E-mail address: Jean-Francois.Henri@ctb.ulaval.ca (J.-F. Henri).

¹ EMA is broadly defined as the identification, collection, analysis and use of financial and non-financial information to support management activities in order to maximize environmental and economic performance and to achieve sustainable business (Bartolomeo et al., 2000; Bennett & James, 2000; IFAC, 2005).

As part of EMA, eco-control is the application of financial and strategic control methods to environmental management (Schaltegger & Burritt, 2000). As a specific application of management control systems (MCS), eco-control has attracted growing attention in recent years as a means of driving an environmental strategy throughout the firm. Eco-control helps organizations to measure, control and disclose their environmental performance. They are used to supply information for decision-making to ensure the attainment of environmental objectives and to provide persuasive evidence supporting the benefits of such actions.

Various streams of research have examined environmental accounting in the accounting and environmental management literatures. In particular, an extensive body of research has examined environmental disclosure and reporting practices (e.g., Al-Tuwaijri, Christensen, & Hughes, 2004; Clarkson, Li, Richardson, & Vasvari, 2008; Deegan & Blomquist, 2006; Gray, Javad, et al., 2001; Lehman, 1999; Neu, Warsame, & Pedwell, 1998).² While some

² The interested reader is referred to the work of Berthelot, Cormier, and Magnan (2003), Gray, Kouhy, et al. (1995) and Mathews (1997) for a complete review of this stream of research.

research has defined the concept of environmental management accounting and has reported current practices (e.g., Bartolomeo et al., 2000; Bennett & James, 2000; Burritt, 2004; IFAC, 2005), other studies have examined the role of accounting/accountants in environmental management (e.g., Bebbington, Gray, Thomson, & Walters, 1994; Gray, 1992; Wilmshurst & Frost, 2001) and issues related to environmental cost accounting (e.g., Antheaume, 2004; Gluch & Baumann, 2004; Herbohn, 2005).

However, the notion of eco-control has not been investigated extensively. Most of the research related to eco-control is descriptive or prescriptive (e.g., Bennett & James, 1999; Burritt & Schaltegger, 2001; Eckel, Fisher, & Russell, 1992; Epstein, 1996a; Epstein, 1996b; Epstein & Birschard, 2000; Figge, Hahn, Schaltegger, & Wagner, 2002). While contributing to the further development of tools, this literature is often based on a limited number of case studies and suffers from a lack of empirical evidence (Bouma & VanderVeen, 2002; Burritt, 2004). Recent studies have however attempted to address this gap by exploring empirically some aspects of eco-control.

For instance, Sharma (2000) examined the integration of environmental performance criteria in employee performance evaluation, but did not find a link with managerial interpretation. In a contingency setting, Pondeville and De Rongé (2005) found that the perceived ecological environmental uncertainty and environmental stakeholders' pressures have a positive influence on the use of formal environmental control systems, but no such link was found with environmental strategy. Similarly, Perego and Hartmann (2005) observed that the relationship between environmental strategy and the use of environmental performance measurement systems is not direct but mediated by some attributes of the environmental management accounting systems sophistication and properties of the measurement systems.

Not only have the issues related to eco-control been overlooked in past research, but there is also a lack of empirical evidence supporting their impact on environmental and economic performance. While various studies have documented the influence of environmental management³ on environmental or economic performance (e.g., Christmann, 2000; Melnyk et al., 2003; Roy, Boiral, & Lagacé, 2001), other studies have examined the relationship between environmental and economic performance (e.g., Al-Tuwaijri et al., 2004; Burnett & Hansen, 2008; McWilliam & Siegel, 2000; Russo & Fouts, 1997; Wagner & Schaltegger, 2004). Those studies have resulted in different findings: positive impact, negative impact or no effect. However, few empirical studies have tested the influence of eco-control on environmental and economic performance. Notable exception includes the work of Judge and Douglas (1998) and Wisner, Epstein, and Bagozzi (2006) that find positive relationships between environmental strategic planning,

and environmental and economic performance. Also, Epstein and Wisner (2005) observed that environmental compliance is positively influenced by various eco-controls, including plans and procedures, belief systems, measurement systems, and reward systems. However, Lanen (1999) does not find any association between the incentives to monitor plant performance and waste ratio.

In sum, because this stream of research is hindered by insufficient empirical evidence and unexplored topics, the findings about eco-control remain fragmented and disparate. At the same time, a rich body of literature has examined the link between MCS and economic performance (Luft & Shields, 2007), but not environmental performance. Hence, there is a need to further investigate eco-control, as a specific application of MCS, and its impact within the organizations in order to contribute to the management accounting and EMA literatures. Using survey-data from a large sample of manufacturing firms, this study examines to what extent eco-control influences environmental and economic performance. More specifically, it uses a mediation model to investigate the direct effect of eco-control on economic performance, as well as the indirect effect through environmental performance.

The remainder of this paper is organized as follows. The next section defines the main constructs, describes the conceptual framework, and presents our hypotheses. The following section presents the methodology, including a sample definition, data collection and measurement of constructs. We next describe the results of our analyses followed by a discussion and the conclusion of this study.

Theoretical framework

Definition of constructs

Eco-control

Eco-control refers to the integration of environmental matters within MCS (Schaltegger & Burritt, 2000). Like MCS, eco-control is designed to help an organization adapt to the context in which it is set and to deliver the key results desired by stakeholder groups (Merchant & Otley, 2007). It is the process by which managers ensure that economic and ecological resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives (Anthony, 1965). Following the definition of MCS from Simons (1987), Simons (1990), eco-control is defined as the formalized procedures and systems that use financial and ecological information to maintain or alter patterns in environmental activity.

In this paper, eco-control is composed of three important practices, namely uses of performance measures, budgeting and incentives. These practices have been chosen because they represent control tools for which a rich body of literature has been developed in the field of management accounting (Ittner & Larcker, 2001; Luft & Shields, 2007; Shields, 1997). More specifically, in the context of eco-control, performance measures refer to the extent to which environmental performance indicators are used by managers for various purposes. From the overlap between the management accounting (e.g., Atkinson, Waterhouse, & Wells, 1997; Henri, 2006a; Henri, 2006b) and the environ-

³ The purpose of environmental management is to develop, implement, manage, coordinate and monitor corporate activities to minimize the negative environmental impact of the firm's products throughout their life cycle (Klassen & McLaughlin, 1996; Melnyk, Sroufe, & Calantone, 2003). Environmental management accounting (EMA) is one component of environmental management (Eckel et al., 1992; Epstein, 1994; Figge et al., 2002).

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