



# Unpacking the indirect effects and consequences of environmental regulation



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## ABSTRACT

Environmental regulation and its corresponding measures and control is an important issue but have not been fully investigated. Literature on the unintended consequences of regulation control and measures appears to be sparse. Through a series of exploratory case studies in China, this paper examines the various unintended impacts of ecological civilisation (EC) regulation on firms' operations and their related consequences to performance. Findings showed that there were interrelated themes that underpin the indirect and unintended effects of regulatory control and performance management. This exploratory study can contribute to both theory building and provide important EC policy implications by: (a) enriching the conceptual understanding of the unintended consequences of environmental regulation on firms' behaviours and outcomes, (b) providing policy maker important insights and practical advices for regulating environmental performance.

## 1. Introduction

Unintended consequences of performance management is an important issue but have not been fully investigated (Meyer, 2009). The debate on environmental performance management is still limited. Governments tend to use various regulations and measures to enhance environmental performance, both at the local governmental level (achieving public policy goals, such as protecting the environment and public from environmental hazards and minimizing industrial wastes) and at the individual firm levels (achieving sustainable business growth and financial performance goals). Such regulations and measures can have both positive intended and negative unintended effects, depending on firm size, industry, and embedded contexts of the firms (Tan and Rae, 2009). However, previous studies have been largely focused on the positive side which can have a short-term effect on environmental performance (Tan et al., 2014; Tseng et al., 2014), but ignoring the potential long-term and indirect effects, which can eventually lead to unintended and negative consequences to performance, both economically and environmentally.

Concerns about sustainable development have grown significantly during the last decade (Brizga et al., 2014; Foo, 2013). In China, sustainable development is guided by a philosophy of 'Ecological Civilisation' (EC). Under the EC philosophical framework, various

metrics and indicators were set for regional governments and firms to create more wealth using less energy. However, local government officers or firms may manipulate set metrics to meet their own interests or to cover their failure to meet the various pressures of achieving the set targets (Tan et al., 2014). For example, it was reported that in 2010 there were plethora enforced blackouts in many cities, where hospitals, schools, and traffic lights had their power cut off when local government failed to meet the tough energy and emissions targets set by the central government in 2006 (Si, 2012). Clearly, in this incident, the pressure to ensure EC compliance (meeting the set targets, which could be overly broad and complex) had forced the officials to cover the reality by fiddling the data.

Nonetheless, the unintended effect of environmental regulations is not only unique in China, but also in other developed and developing countries. For example, it was only one year after the Fukushima Daiichi nuclear disaster that the Tokyo Electric Power Company (TEPCO) has admitted their failure to meet basic safety requirements (such as risk assessment, collateral damage preparation and evacuation plan development) in fear of eliciting lawsuits or protests against its nuclear plants. There are also a number of examples from the automobile industries recently. Goulder et al. (2012) points out that in response to the climate change, 14 states in America took a series of initiatives to limit greenhouse gas emission per mile. The unintended

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effect of that was the large car manufacturers in the 14 states decided to relocate to other states which have lower emission control. Because the restriction has largely decreased the profit margin of the large-car manufacturer, so rather than devoting to innovation on reducing emission, they chose to move out of the regulated states (Tan et al., 2014). Another recent example was related to Volkswagen intentionally programmed their diesel engines to meet US standards during regulatory testing but emit up to 40 times more nitrogen oxide in real-world driving. The above examples suggested that regulated measures not only failed to improve the environmental performance of the automobile industry, but also have unintended consequences to the company long term performance and local economy. In developing countries, one example can be found in the 1989 *Hoy No Circula* (today it doesn't circulate) scheme introduced by the Mexico City to combat air pollution. The city banned cars for one day per week depending on the last number of their number plate (i.e. cars with last number of 1 and 2 are banned on Monday, then 3 and 4 on Tuesday, and so on). Initially, the scheme achieved good results in bringing down carbon monoxide (CO) pollution levels by 11%. However, the scheme also led to the enlargement of second car market i.e. residents began buying second cars (often old inefficient ones) to get around the ban. The long-term impact of the scheme has been a 13% rise in CO (Mathiesen, 2014).

Needless to say that EC regulation can cause unforeseen negative consequences in particularly when firms or individuals try to circumvent the regulations to avoid the high costs of compliance or behave opportunistically (Tan et al., 2014). But, what are the scope and extent of these unforeseen consequences that can have impact to economy, society and company performance? The evidence found in existing literature that has focused on the unintended consequences of regulation and its corresponding measures on firms' operations appears to be sparse. In particular, how should firms respond to EC regulation? What performance measurement systems (i.e. metrics) will managers establish to comply with EC regulation? For example, to which extent measurement of performance and the corresponding incentive structure within firms can be compared with what the initial regulation intended. Thus, understanding the potential unforeseen consequences of metrics used by firms to comply with well-intended environmental regulation is vital – especially the unintended negative consequences on local environment and firms' performance.

This paper aims to examine the various unintended impacts of environmental regulation on firms' operations and their related consequences to performance. This paper can contribute to both theory building and provide important policy implications by: (a) enriching the conceptual understanding of the unintended consequences of regulation and environmental performance, and (b) providing policy maker important insights and practical advices for regulating environmental performance. The remainder of the paper is structured as follows. The next section reviews the literature on the unintended consequences of environmental regulations and performance measurement systems. Section three outlines the research methodology. The findings are presented in section four, followed by a discussion of their significance and contribution. Finally, limitations and suggestions for future works are articulated.

## 2. Theoretical background

Interest in performance measurement in sustainable operations has been driven by an increased demand for better environmental and green indicators in firms' operations and economic development (Wu et al., 2015). There is also emphasis on demonstrating transparency in corporate social responsibility (for firms and governments) especially on environmental management (Huang and Chen, 2015). Many researches pointed out that tighter environmental regulation and public reporting leads to improvements in environmental management, and reported data provides information on areas of under-

performance, leading to a stimulus (regulations) for improvement from the policy makers (Bricknell, 2010; Gilliland and Manning, 2002; Goulder et al., 2012; Powell, 2011; Tan and Rae, 2009). However, the assumption that regulations will result in improvements in environmental management rests on the assumption that the outcome being measured is amenable to compliance or improvement.

How performance measures are used does varies with firms (Meyer, 2009). Unfortunately, most of the performance measurement (PM) literature focuses on the corporate-level measures that *monitor* results rather than on measures that *motivate* appropriate behaviour (Weidinger and Platts, 2012; Waggoner et al., 1999). Performance measures at the corporate level tend to be aggregated (while appropriate to indicate overall firm performance), may not be suited to motivate appropriate employees' behaviour to comply rigid environmental regulation measures. Thus, regulators must be conscious of the extent to which environmental metrics can be manipulated or gamed by firms, or the extent to which the metric can encourage undesired behaviours. As such, regulation without robust metrics can affect a firm's strategic direction and operations in different ways for different firms as well as triggering many unintended negative consequences to the environment.

In the organizational theory literature, unintended consequences are the result of environmental uncertainty and the bounded rationality of organizational actors (Selznick, 1948). Predicting a manager's action in an uncertain and complex world is not easy. Thus, some of the unintended consequences could be unstated, but not unintended (Osborn and Daniel, 1988). Tan and Rae (2009) argue that the impact can be dependent on firm size, industry, and the environmental and social contexts the firm located in. They further argued that the short-term implications of regulation and PM on the firm can be very different when comparing with the long term implications. For instance, regulation and performance measurement increases costs and reduces efficiency for all firms, but the impact will be greater for the smaller firm. In long-term, most of the firms may attempt to find ways to reduce the costs and increase efficiency, though some may choose to minimize the compliance to regulation, whilst others through process improvement and innovation, but this will be achieved a lot quicker by the bigger firm who has more resources (Tan et al., 2014).

Clearly, the outcomes of performance measures can have an interlocking impact on the effectiveness of the regulation. Nonetheless, in the literature there are only a few articles that mentioned unintended consequences of PM and regulation. These authors (Adcroft and Willis, 2005; Brigham and Fitzgerald, 2001; Humphreys and Francis, 2002; Shaffer, 1995; Tan and Rae, 2009) highlight that the relationship of regulation and PM is an area relatively unexplored. There are strong links exist between regulation and PM at firm level, in which regulation can have significant impact on the performance of the firm and the types of performance measures it uses. Tan et al. (2014) identified that regulation impacts on the firm at different levels: from the strategic level to the individual employee level, which in turn affect the performance measurement systems used by the firm.

## 3. Research methodology

The study of the unintended consequences of regulation and performance measures has relatively little theoretical background (Tan and Rae, 2009; Tan et al., 2014). Thus, in order to gain more insights into the issue, a series of empirical and archival case studies were carried out. The aim of the case study was to understand the scope, extent, and causes of unforeseen consequences of EC regulations. More specifically, the objective was to understand how best to achieve EC compliance and mitigate unforeseen consequences. Fig. 1 provides a graphical representation of the key steps in the research process.

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