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Voluntary Agreements, Flexible Regulation and CER: Analysis of Games in Developing Countries and Transition Economies

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Abstract

In this paper, we study the implementation of environmental voluntary agreements (EVA) in developing countries and transition economies to effectively motivate firms to take corporate environmental responsibility. We uses flexible regulation (FR) as the background pressure of EVA and present a four-stage game-theory model to explore under which conditions firms will comply the law and take environmental responsibility. We find that EVA could be the equilibrium outcome as long as existence of the background pressure, and the equilibrium level of abatement could exceed the standard of legislation when the background pressure of FR is large enough or the unit cost of abatement under EVA is low enough, or the social cost of capital is low enough. We also identify that the increase of abatement level will not increase firm's abatement cost in EVA, and sometimes even be lower with the support of technology and cost-sharing assistance in EVA. In addition, we suggest that the firm can actively choose the first-best level of taking environmental responsibility before participating into EVA, which can minimize the total abatement cost.

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Keywords: Corporate environmental responsibility; Voluntary agreement; Rlexible regulation; Game theory; Institutional environment

1. Introduction

With the deepening of environmental governance, environmental public policy tools are changing from mandatory to voluntary [1]. In developed countries, Environmental Voluntary Agreements (EVAs) have been

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widely implemented as policy tools to encourage firms to over-comply with the mandatory law. In developing countries and transition economies, however, governments have ever tried their best to implement voluntary programs to remedy the rampant company' behaviours of non-compliance [2], and the result is less encouraging. According to Blackman's case studying, only one out of eleven cases gives reasonable evidence that EVAs in the condition of developing countries has a significant positive impact on firms [3]. Whether EVA can be an effective tool to prompt firms to behave in responsibly ways and how to make it effective, are the key issues in academic and practical circles in recent years [4, 5].

The finds of most empirical research on this subject have been somewhat mixed. Some literatures suggested that EVA is an effective police tool [6], but the others do not think so [7]. Matisoff (2015)reviewed these literatures, and found that the paradox is the result from specification error in evaluations of EVA and suggested a variety of mechanisms that EVA may produce positive firms' environmental performance with low social costs [8]. As a result he called for some theoretical inquiry into this issue. Therefore, this paper tries to fill this gap by developing an economic model to analyse how EVAs to make the firms abatement and lead firms comply or over-comply the standard of legislation.

Segerson used a simple model to explore under which condition the EVA is likely to lead to effective environmental protection [9]. But his research is on the background of developed countries. As for the developing countries, the weak capacity to enforce regulations makes the firm lack motivations to take environmental responsibility. Khanna et al. suggest that the combination of voluntary approaches and law enforcement are needed to environmental protection [10]. Blackman explores the effect of EVA in developing countries through an analytical framework, and finds that the EVA do not spur abatement without strong background regulatory pressure and design features that leverage this pressure [3]. Based on extent literature, this paper will consider the case where firms are facing the background pressure of regulation and EVA with technologies information and cost-sharing assistant, and develop a game model to explore the mechanism of combination of these two police tool to encourage polluting firms to take environmental responsibility in developing countries and transition economies. As considering the key issue that the background pressure of legislation is not credible, this research use the flexible regulation (FR) which is used widespread in Colombia, the Philippines, Indonesia, China, and Mexico [11].

The rest of paper is organized as follows. First we demonstrates theoretically that EVA can create a certain institutional environment for firms and motivate them to take environmental responsibility under the external pressure of FR. Second, we construct a four-stage model to explore the mechanism of implementing EVA and FR. We then discuss the condition under which FR and assistants can motivate firm to take environmental responsibility with the level higher or lower than the standards of the law. Last, we conclude and discuss the limitation and the future direction.

2. Theoretical background

2.1. Environmental voluntary agreement creates institutional environment for firms

After evaluating 350 EVA, International Energy Agency has found that these agreements can increase social wealth and incentive firms to super-comply legal standard. For developing countries, Blackman [3] also suggests that EVA can lead to effective environmental protect under the conditions of sustained external pressure and reasonable design. Under the pressure of external regulation, designing voluntary agreement reasonably can result in a favourable institutional environment to encourage firm to take voluntary environmental activities. Specifically, first, the favourable institutional environment in the voluntary agreements can lead the firms exempt from legal supervision in the period of the agreements [12, 13], which can create relaxed environment for them to implement environmental innovation. Second, voluntary agreement can also integrate several policy tools to provide a package of economic incentives and solutions [8], which includes financial subsidies, tax relief, credit support, environmental accident insurance and direct cost-sharing assistance and so on [14]. Third, Building information platform by voluntary agreement can deliver technology knowledge, invite experts for guiding, communicate with each other and share successful experience [15]. Last, third party organizations, especially industry associations, can fully play the roles of guiding, supervision and network [16, 17].