



Shareholder value effects of corporate carbon trading: Empirical evidence from market reaction towards Clean Development Mechanism in China



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ARTICLE INFO

Keywords:

Clean Development Mechanism
Shareholder value
Market reaction
Corporate performance
Event study

ABSTRACT

Are shareholders sensitive to corporate initiative of implementing Clean Development Mechanism (CDM) projects? And if so, what are the key factors that influence the corresponding abnormal return to enterprises? To answer these questions, we employed an event study methodology to evaluate the stock market reaction to the CDM projects certification in China since 2005. We illuminated three sources of ambiguity in the relationship between corporate CDM initiatives and shareholder value, namely the impacts from time, CDM types, and credits of carbon emission reduction (CER). Our empirical results showed that the CDM initiatives could benefit corporate shareholder values. The expected CER credit is the main driver for the increase in shareholder value. However, we also found that the positive shareholder value effect of CDM decreases over time. In particular, industrial gas CDM projects rather than renewable energy and energy efficiency projects are preferred by shareholders; but there are no significant differences in the shareholder value effect between bilateral contracting and unilateral implementation. This paper advanced knowledge on the shareholder value effect of corporate CDM initiatives, and more generally, the impact of corporate carbon trading on financial performance of enterprises in an emerging country context.

1. Introduction

The challenges associated with climate change have been urging firms to control their carbon emission levels (Reid and Toffel, 2009). Carbon trading becomes a popular strategy of firms to work collaboratively for reducing greenhouse gas emissions through sharing information on companies' carbon risks, opportunities, and cost. As a project-based carbon trading, Clean Development Mechanism (CDM) is organized under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (Zhang and Wang, 2011; Cadman and Maraseni, 2013). So far, CDM is the only flexible Kyoto mechanism that engages developing countries in climate change mitigation, and its main objective is to help Annex I countries to meet their quantified emission reductions obligations at lower cost by using carbon offsets from Non-Annex I countries (Maraseni et al., 2005). CDM enables Annex I countries to reduce costs of compliance with emission reduction commitments, because the marginal abatement costs of the Non-Annex I countries are lower than the Annex I countries. CDM is considered an important instrument motivating the participation of

developing country enterprises in carbon emission reduction. Another goal of CDM projects is to provide convenient channels for low carbon technology transfer from Annex I countries to Non-Annex I countries (De Coninck et al., 2007; Maraseni and Xinquan, 2010). Through technology transfer in CDM, Non-Annex I countries who are great in need of low carbon technology can better achieve sustainable development, and Annex I countries who provide advanced technology can share the achievement of carbon emission reduction from CDM. China has been global largest CDM suppliers (Maraseni, 2013), and benefits a lot from CDM implementation. There are around 782 million tons of CO₂ reduced from CDM projects in China every year, which account for around 8% of total emissions of China.¹

Different from cap-and-trade system, CDM provides a baseline-and-credit program for corporate carbon trading. Carbon credit suppliers have no explicit caps in the CDM program. However, these two systems could be numerically equivalent without considering the level of caps. CDM allows the project developer in a given country to either sell the CER credits from the project on the global carbon market (Unilateral implementation) or cooperate with interested foreign investors directly

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¹ The data source is available at <http://cdm.ccchina.gov.cn/NewItemList.aspx>.

on CER (Bilateral contracting) (MacKenzie et al., 2011). In developing countries, the investment of private sectors could be mobilized by CDM for reducing greenhouse gas (GHG) emissions, as the credit of carbon emission reduction (CER) could be traded with buyers from the developed countries listed in AnnexI of the Protocol.²

Although CDM has been an important mechanism to deal with global climate change, the effect of CDM is still a controversial topic in the management science literature. Lowering abatement costs and promoting sustainable development are the dual goals of CDM (Rahman and Kirkman, 2015). A number of current studies have recognized the significant contribution of CDM toward the development of renewable energy and mitigation of GHG (Lewis, 2010; Zhang et al., 2011). Nonetheless, CDM receives mounting criticisms. Particularly in the host countries, the CDM projects could be low-cost for emission reduction, but are often not aligned with the sustainability priority as local pollutants are distinguished from CER credit in that most of the former are not tradable in the market. The carbon market cannot optimally allocate resources for non-monetized sustainability. Some argue that the benefit of CDM is compromised in view of sustainability goal (Olsen, 2007), as CDM suppliers lack the incentive to gain other benefits such as pollution prevention than CER credit. Moreover, although CDM brings economic benefits from selling CER credits, its effect on corporate total financial performance is still unclear, as CDM implementation may bring additional operation cost or cause financial responses from shareholders. From the extant literature, the relationship between financial performance and corporate activities on emission reduction has been studied with mixed results (Jacobs, 2014). Some researchers find positive financial effect from emission reduction (e.g., Konar and Cohen, 2001), while there are also other studies observing insignificant or negative association between emission reduction and firm performance (e.g., Fisher-Vanden and Thorburn, 2011; Kroes et al., 2012). The seemingly contradictory results indicate that the relationship between emission reduction and corporate performance is not homogeneous. Rather, it depends on specific corporate activities employed to reduce emissions. Different from other corporate practices for emission reduction, corporate carbon trading promotes CER in individual firms by pricing the CER credits. Theoretically, there are financial incentives of corporate carbon trading for CER by individual firms. Kroes et al. (2012) have discussed the variance of environmental and financial performance under cap-and-trade system. Yet, there are scant studies providing empirical evidences on the financial value of corporate carbon trading, particularly in targeting CDM programs.

Moreover, even recognizing that CDM contributes revenue by trading the CER credits (Bayer et al., 2013), it only increases non-core business income and that the value of CDM implementation for corporate shareholders remains unknown. Particularly in considering the response from shareholders, it is unclear whether CDM projects are beneficial for corporate shareholder value. A unique feature of this study from prior research is our focus on the shareholder response to the corporate CDM implementation. An underlying assumption in the extant literature on CDM projects is that CDM could bring economic benefits to firms as a result of CER credits trading. It will bring positive market reaction because corporate shareholders believe that CDM implementation will increase corporate profitability. Additionally, the implementation of CDM could also provide signals of high social responsibility for sustainable development. The value and positive signals help the firms construct social reputation and better corporate image (Rao, 1994), nurturing positive responses from shareholders. Shareholder actions are likely to prompt practices adoption by firms in alignment with broad social concerns, such as disclosing climate change strategies (Reid and Toffel, 2009). Increase in corporate shareholder

value can be expected if the climate change strategies of firms are successful. Although the relationship between corporate social responsibility and shareholder value is a popular topic in the strategy literature (Godfrey et al., 2009), the shareholder value effect of CDM implementation as a reflection of carbon trading strategy to fulfill corporate social responsibility in environmental protection is lacking research attention.

Different from the large literature that studies how the stock market reacts to the adoption of green initiatives and other environmental programs (e.g., Ba et al., 2013; Flammer, 2012; Konar and Cohen, 2001), our study contributes in exploring market reactions to carbon trading practices which has both green initiative characteristics and financial motivations. To the best of our knowledge, this could be the first paper that evaluates the financial effect of CDM at firm level for the project suppliers. Moreover, management scholars have generally focused on positive signals and the benefits that they can provide to the firms (e.g., Higgins et al., 2011; Pollock and Gulati, 2007), yet scant attention has been paid to the change of shareholder value effect with time. Time effect of market reaction towards CDM is another contribution of our study. Specially, this paper aims to address the following questions concerning shareholder value effect in Chinese CDM projects:

- How would market react in response to the corporate adoption of CDM projects?
- Would the market reaction changes over time?
- What kinds of CDM features will influence the market reaction towards CDM implementation?

To answer the above questions, this paper employed an event study approach to examine the relationship between CDM certification and shareholder value of CDM suppliers in China. We employed signaling theory to examine the shareholder value effect of CDM implementation, advancing knowledge on the theory by exploring the time effect of signals. Corporate CDM certification could provide reputation and profitability signals which are determined by the value or quality of CDM in the eyes of shareholders at the certification time. However, reputation signals providing similar information to the firms could not bring constant impact over time, because image resides at level of perception and can change over time (Backhaus et al., 2002). We empirically analyzed the time effect of signals with a focus on how shareholder value effect of CDM certification changes over time.

2. Theory and hypotheses

Signaling theory was employed to guide the development of our hypotheses. Signal was defined as activities or attributions of individuals in a market that “alter the beliefs of, or convey information to”, other individuals in the market (Spence, 1974). Framing our research in signaling theory, CDM implementation could be perceived as a signal of ability in response to climate change issues and carbon trading with CDM credits buyers. This signal transmits to shareholders who are signal receivers in our study, with warranty of carbon trading benefits and improvement in social responsibility reputation. Normally, shareholder value is positively related to corporate financial performance as well as public image. The financial performance reflects corporate profitability and competitiveness which lead to the variance of market value (Gardiner and Portney, 1999; Tsikriktsis, 2007). Also, poor reputation of firms is recognized as a high risk premium often damages the corporate shareholder value (Cornell and Shapiro, 1987).

2.1. Signals of financial benefits from corporate CDM

The signals stemming from corporate environmental strategies remain controversial regarding the performance value for firms. The efficacy of a signal is related to two key properties: signal cost and signal

² There are 43 Parties to the UNFCCC listed in AnnexI of the Protocol. These parties include industrialized (developed) countries, as well as the “economies in transition” countries which are former centrally-planned economies of Russia and Eastern Europe.

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