



Do efforts on energy saving enhance firm values? Evidence from China's stock market



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ABSTRACT

This paper studies the impact of energy-saving efforts on firm value, using the carbon emission rights trading scheme (CERTS) of China as an exogenous shock. The results showed that the CERTS increases the market value of energy-related firms; moreover, the energy-saving efforts of firms further influence their market value and investor reaction. Energy-related firms improve their market value and gain benefits by strengthening their energy-saving activities. This paper offers an important policy implication that the Government should enact appropriate policies to improve the energy-saving activities of firms, especially in the energy industry.

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1. Introduction

With its rapid growth, China has become the second largest economy in the world after the US. However, the current environmental problems in China have also aroused public concern worldwide. Energy saving has become one of the most important issues in the agenda of the Chinese Government because China has been the second largest producer of carbon emissions in the world for years, outranking even the US since 2007.

China's large population, coal-fueled economy, and factories producing international products have all combined to produce considerable amounts of absolute emissions (Zhang, 2010). In response, the Chinese Government has enforced policies on environmental protection and explored industrial policies that aim to promote industrial upgrading and energy conservation. China has eliminated or cut export tax rebates for 2831 exported items since July 2007 (Zhang, 2008); for example, the export tax rebates for 553 "highly energy-consuming, highly polluting, and resource-intensive" products, such as cement, fertilizer and non-ferrous metal, were completely eliminated. Moreover, ahead of climate talks in Copenhagen in 2009, the Government announced its first firm target of limiting greenhouse gas (GHG) emissions by reducing carbon intensity in 2005 by 40% to 45% before 2020.

The Government has also approved a pilot carbon emission rights trading scheme (CERTS) in seven provinces (i.e., Beijing, Tianjing, Shanghai, Chongqing, Hubei, Guangdong, and Shenzhen) to reduce carbon emissions. Following the two largest emission rights trading schemes, namely, the US Acid Rain Program and the European Union Emissions Trading Scheme (EU ETS), the CERTS of China aims to achieve emission reduction targets while minimizing costs.

Given that the Chinese Government has intensified its environmental protection policies, energy-related firms that exert efforts to save energy also enhance their public reputation, especially among investors (Russo and Fouts, 1997). The CERTS enables emission rights to be traded and considered firm assets (Point Carbon, 2004). Moreover, emission rights influence firm profitability (Peri and Baldi, 2011) and value in the stock market (Veith et al., 2009).

Owing to the importance of the CERTS in the energy industry, its effect on energy-related firms and the effect of firms' energy-saving activities on investor reaction warrant further investigation. Analyzing these relations may shed light on the policy and on the effect of energy-saving activities on asset returns, market reaction, and shareholder wealth. Thus, the current research has important implications for regulators, listed firms, and participants in the capital market.

In this paper, we use the CERTS of China introduced on October 29, 2011, as the springboard for examining the abovementioned issues. Our sample consists of all firms in the seven pilot-scheme regions listed in the Chinese stock market. We use a sub-index of the corporate

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social responsibility (CSR) index in China to measure the efforts of firms on energy-saving and related activities. This CSR index issued by the Shanghai National Accounting Institute (SNAI) in 2008 is the first available index used for Chinese listed firms. One sub-index of this CSR index is energy saving. We then obtain stock price, size-weighted stock market return, and other control variables to estimate investor reaction to exogenous shock, using data from the China Center for Economic Research (CCER) Database, a widely used database for research on Chinese listed firms.

We also employ event studies to investigate the impact of the CERTS, an exogenous shock, on listed energy-related firms as well as the effects of the firms' energy-saving efforts on investor response. We conduct the empirical analysis as described below.

First, we use event studies to assess the impact of the CERTS on the financial performance of energy-related firms. Regressions of cumulative abnormal returns (CAR) on the dummy variable for energy-related firms indicate that the event has significant positive impact on the financial performance of such firms. Second, we investigate the influence of energy-saving efforts on investor behavior by using a regression of CAR on the interaction between the dummy variable for the energy industry and the levels of energy-saving efforts of listed companies. Third, we repeat the above regression to further explore the difference between the two types of firms in our sample, namely, state-owned (SOEs) and non-state-owned enterprises (non-SOEs). Energy-saving efforts more significantly affect the value increments of energy-related SOEs than non-SOEs. As a result, investors may consider energy-related SOEs to have more emission rights or a higher quota; thus, they are more likely to have spare allowances for trading with other firms than non-SOEs. This perception increases the value of such SOEs.

We contribute to the literature in two ways. First, we assess whether the exogenous event CERTS affects energy-related firms. To our knowledge, this paper is the first to investigate the CERTS and its effect on related Chinese firms. This is also the first study to use energy-saving efforts, a sub-index of CSR, as a variable indicating that investors in capital markets significantly react to the energy-saving efforts of a firm upon recognizing the importance of such efforts. Our results offer the Government timely empirical evidence that can provide regulators critical insights, through which they can issue appropriate policies on enhancing firms' energy-saving activities, ultimately protecting the environment.

Our findings also shed light on the effect of energy-saving activities on the energy-related firms themselves. Investors regard the energy-saving activities of such companies as important factors in their investment decisions. Investor trades affect firm price; thus, energy-related firms should strengthen their efforts to save energy, decrease operation costs, and improve their reputation.

This paper is organized into sections. The next section reviews related literature and presents testable hypotheses. Section 3 describes the research methodology and data sources. The empirical results are presented in Section 4 and the conclusion is presented in Section 5.

2. Institution background and hypothesis development

2.1. Institution background

The Chinese Government enacted the CERTS based on some important reasons. First, the Government honored the promise it made at the Copenhagen Climate Conference to reduce GHG emissions in China. Thus, its five-year plan for 2011 to 2015 includes energy saving – a target that motivated the establishment of the CERTS. According to the National Development and Reform Commission (NDRC), China is making an effort “to control the emissions of greenhouse gases, i.e., CO₂, and [trying its] best to deliver a 40% to 45% reduction in carbon intensity by 2020.”

Second, as a major supplier of the international carbon emission market, China should set up independent carbon emission trading rules and

markets. In doing so, China can reduce its dependence on the carbon emission market based on the Kyoto Protocol.

Finally, as the second largest economy in the world, China is in a critical stage because of its structural adjustments and development transition. In relation to this, the CERTS can encourage firms to save energy and reduce emissions. Market regulation can also be used to reduce pollution from firms by effectively utilizing resources that, in turn, can ensure the sustainable development of firms and the country's economy.

The CERTS has already made remarkable progress in the seven pilot-scheme provinces. These places account for carbon emissions based on the national standard; they also make modest quotas, establish primary trading rules, and set up their respective trading institutions and third-party certification bodies. These actions guarantee the necessary conditions for successful trading.

On the one hand, the Government is also preparing a punishment system to strengthen the national CERTS. For instance, the emission regulation rules of the Special Economic Zone of Shenzhen hold that for firms that exceed emission limits, the competent carbon emission trading authorities can impose fines on such illegal carbon emission worth three times the market price. Similarly, the Shanghai CERTS decides that all factories and enterprises must only generate limited amounts of carbon emissions annually and pay fees for excess emissions.

On the other hand, the Government has also been preparing incentives. For example, the NDRC has cut three years worth of taxes for professional contract energy management companies, and provided fiscal subsidies for projects that implement energy-saving technologies. In order to encourage supervision during carbon trading, Li Zuojun, vice president of the Resources and Environmental Policy Sector of the Development Research Center, suggests that regulators can set up a credit accumulated system for carbon, which can be considered a certificate of reputation obtained by firms.

At the national level, regulators have made policies on voluntary trade, third-party certification and filing, statistical accounting rules, and transparency of information disclosure in carbon emission. For instance, as part of the official launch of the CERTS in Guangdong, the Guangzhou carbon emissions exchange signed the subscription confirmation of quota for carbon emissions with various enterprises, such as the Guangdong Tapai Group (SZ. 002233) and the China Resources Cement Holding (HK. 01313), which aggregately subscribe to a quota of 1,300,000 tons of CO₂ emissions for capacity expansion. Meanwhile, Guangdong has incorporated 827 enterprises to control their carbon emissions. Beijing has also incorporated about 600 enterprises as participants in carbon emission trading in the city.

Generally, the CERTS is still in its pilot phase. Since September 2012, the electricity, chemical, and six other industries have been required to submit a carbon emission data guide. Their carbon trading derivatives have also been examined. Compared with other cities, Beijing and Shanghai are already in the operation phase, while 107 enterprises in Hubei have already been incorporated into the pilot-scheme firms. On September 11, 2012, the Guangzhou carbon emissions exchange was formally founded, with the first deal completed on that day.

In sum, the pilot-scheme regions have begun to play a role in the CERTS. The Government expects that, by 2015, the CERTS will have become a regional carbon emissions trading market that is compatible, open, and effective. However, given the data limitations, we cannot yet obtain actual trading data because the CERTS in the pilot-scheme regions is still at its early stages. Nevertheless, using event studies, we can investigate the effect of this event on firms by studying investor response and prediction about this event.

2.2. Hypothesis development

In 1995, the US launched the Acid Rain Program, a market-based initiative taken by the US Environmental Protection Agency to reduce the overall atmospheric levels of sulfur dioxide and nitrogen oxide. In

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