



The impact of verified emissions announcements on the European Union emissions trading scheme: A bilaterally modified dummy variable modelling analysis



Jun-Jun Jia^{a,b}, Jin-Hua Xu^{b,*}, Ying Fan^c

^a School of Management, University of Science and Technology of China, Hefei 230026, China

^b Center for Energy and Environmental Policy Research, Institute of Policy and Management, Chinese Academy of Sciences, Beijing 100190, China

^c School of Economics & Management, Beihang University, Beijing 100191, China

HIGHLIGHTS

- The impact of EC verified emissions announcements on the EU ETS is evaluated.
- The traditional dummy variables are bilaterally modified to capture the impact process.
- Emission announcements exhibit heterogeneous ex-ante and ex-post impacts.
- There is an obvious asymmetry between ex-ante and ex-post impacts.
- Empirical findings provide useful reference for market traders as well as regulators.

ARTICLE INFO

Article history:

Received 3 November 2015

Received in revised form 2 April 2016

Accepted 6 April 2016

Available online 22 April 2016

Keywords:

European Union emissions trading scheme (EU ETS)

Verified emissions announcements

Dummy variables modelling

Event study

Carbon price

ABSTRACT

Carbon trading scheme is easily subject to the shocks from vital information announcements or regulations modification due to its vulnerability as a man-made market. This paper investigates the impact of verified emissions announcements, which are released annually by the European Commission and span three phases (2006–2013), on carbon price returns and volatility in the European Union emissions trading scheme (EU ETS), by constructing econometric model with bilaterally modified dummy variables of high adaptability. The results show that on average, verified emissions announcements have significant impact on carbon expected returns but show a week effect on price volatility; the separate examination for each announcement event indicates heterogeneous ex-ante and ex-post impacts over time in different market contexts, but the ex-post impact dominates obviously. The verified emissions announcement remarkably causes shocks to the market and the risk of prior information leakage although it facilitates the price discovery. Meanwhile, there is an obvious asymmetry between ex-ante and ex-post impacts that is triggered by market characteristics, and it generally takes more than seven days to absorb the ex-post impacts due to the intrinsic characteristics of the EU ETS. These findings could provide reference for market traders and regulators to make robust allowance management strategy and system design.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

As a cost-effective policy instrument to reduce greenhouse gases emissions, the European Union emissions trading scheme (EU ETS) has experienced three phases: phase I (2005–2007) (i.e., the trial period), phase II (2008–2012), and phase III (2013–2020), which respectively coincide with the first and second commitment period of the Kyoto Protocol. Different from naturally formed market (e.g., the oil market), as a purely man-made market, the EU ETS

needs a set of institutions and rules to set the emissions cap for greenhouse gases, making carbon allowances the tradable scarce resource, to specify the coverage scope, the allowances quantities allocated, the way of allocating allowances and the compliance process of regulated corporations, guaranteeing the stable operation of the carbon market. Apparently, the establishment and the adjustment of the operational institutions and rules in the carbon market may bring about dramatic shocks to the market itself. Therefore, it is valuable to investigate the influence channel of the operational institutions of the carbon market and their underlying shocks on carbon price returns and volatility, which will contribute to evaluating the operation efficiency of the carbon market and

* Corresponding author.

E-mail address: xujinhua111@163.com (J.-H. Xu).

improving its regulation system. Meanwhile, it helps traders to grasp the impact law of institutions on the market and make more robust trading strategies when they trade the carbon emission credits.

Although the EU ETS is impacted by market fundamentals, policy and regulatory announcements tended to directly impact the supply and demand of allowances and impacted carbon prices dramatically in the short run [1]. Among market fundamentals, the relative prices of coal and natural gas impacted carbon prices significantly by influencing the fuel-switching decision in the power sector [2,3]. As for climatological factors, temperature could affect carbon returns by influencing the utilization of installed capacity of renewable energy and CO₂ emissions from fossil fuel consumption used for electricity generation. But empirical results showed that only extreme hot or cold weather events in some countries (e.g., Germany, Spain, France, the UK) had significant impact on carbon prices and the impact magnitude was smaller than that of fossil fuels prices [2–5]. In addition, macroeconomic performance and risk factors had weak impact on carbon prices [6–8]. Among policy and regulatory factors, National Allocation Plans (NAPs) determine the total allowances to be allocated and the way of allowances allocation in each nation. The sum of the allowances quantity in each NAP is the emissions cap for the EU ETS, which directly determines the supply of allowances. In addition, NAPs specified the distribution of allowances among different industries and indicated the scarcity of allowances in each industry sector [9,10]. Conrad et al. [11] found that NAPs II announcements had long-lived and stronger impacts on carbon prices, as compared to the announcements of economic performance indices from the US and Germany. However, compared with verified emissions announcements, NAPs had smaller impact on carbon prices because NAPs tended to be enacted before each phase started generally [12,13].

Among the set of institutions and rules of the EU ETS, it is of pivotal importance for the verified emissions announcement institution that releases the allowance demand information, since the allowance supply level is relatively fixed [7,12–14] and pre-determined in NAPs for each phase. According to this institution, in early April of each year, the verified CO₂ emissions of last year at the installation level are announced, and the announcement makes the daily stochastic CO₂ emissions conditioned on energy prices, weather conditions and other factors deterministic [15]. The announced verified emissions directly determine the demand for allowances from firms with compliance obligation and may cause intense volatility in carbon price within the short time when the information is released. For example, in April 2006, it is the announcement of verified emissions of the Czech Republic and the Netherlands etc. that leads to a dramatic drop in carbon price from near 30 Euros per ton of CO₂ to 12 Euros per ton of CO₂ within a few trading days, causing the structural break in the carbon price series [4]. Sharp price fluctuations may increase the risk of investing in low-carbon technology in the long term, decrease the dynamic efficiency of the market, and present great challenges for effective market administration [9].

The verified emissions information announced by the EU ETS unveils the balance power between allowance supply and demand, and impacts the carbon prices by affecting the decision-making process of firms with compliance obligation and by prompting financial investors to adjust the optimal investment portfolio according to the verified emissions information. For firms with compliance obligation, all regulated firms are required to surrender allowances that are equivalent to the realized emissions of the preceding year to complete their compliance before the end of April [14]. The short-term compliance obligation and long-term allowance management strategy render the corporations to adjust their holding amount of allowances. In the short

term, the firms with compliance obligation may buy a certain amount of allowances to fulfil their obligations if their allowances are insufficient to cover their realized emissions of the previous year. Although these companies could take advantage of intra-phase borrowing mechanism to honour their commitments, they are very likely to buy certain amounts of permits to serve as strategic reserves and to prevent possible shortages in the future. As the verified emissions information is released, firms with sufficient allowances may sell part of permits to make gains. In the long term, the firms with compliance obligations would make projections as to whether the market will be long or short in the whole phase since the annual verified emissions information provides an important reference indicator for CO₂ emissions demand over the next few years. Subsequently, they can alter their allowance management strategy. As important participants of the EU ETS, financial institutions would adjust carbon assets position and reduce carbon assets risk according to the verified emissions information. On the one hand, financial institution investors can hedge to avoid short-term price volatility risks in futures markets. On the other hand, the release of verified emissions can help investors to calibrate the projections concerning allowances' supply and demand over the medium and the long term, and to reappraise the risk of carbon assets and adjust the optimal assets portfolio.

Therefore, by and large, verified emissions announcement institution triggers different response of firms with compliance obligation and financial institutions to verified emissions information, causes different trading behaviors of these two participants, and results in varying degrees of shock on the carbon prices. Due to the significance of verified emissions announcement institution and the fact that verified emissions information is disclosed in just one day, it is highly probable that verified emissions announcements would have persistent impact on the market.

Initialized in 2005, the EU ETS has been developing rapidly with the perfection of carbon trading rules and institutions. Correspondingly, there has been a host of studies on improving carbon market institution design, quantitatively investigating the impact of important events and institutional reform on carbon prices and exploring market informational efficiency.

The discussion about evaluating present institution design of the EU ETS and identifying the existing problems could help to point out the direction of market reform. Although there exists various issues in the EU ETS such as over-supply of allowances [10,16], free allocation [17], market behavior distortion stemming from new entrant and closure terms [18], insufficient use of Joint Development Mechanism (JI) and Clean Development Mechanism (CDM) [19], the analysis about these issues provided theoretical basis for managing the EU ETS on the European Union level [10], auctioning the allowances instead of free allocation and introducing necessary carbon price stable mechanism [20]. In addition, the reform measures implemented in the EU ETS indeed have significant impacts on the carbon prices. For example, inter-banking mechanism determines whether unused allowances can be banked to the following phase. And the allowance price would be unstable and be likely to fall into zero at the end of the phase in case of allowances surplus. As a consequence, the announcement of the French ban inter-banking from phase I to phase II depressed carbon prices [21].

Verified emissions announcements institution unveiled allowances demand information and may cause big shocks to the market. Existing studies focused on the analysis of 2006–2010 verified emissions announcements. Chevallier et al. [22] compared the risk-neutral distribution of price options and the historical distribution of futures prices. They found evidence of a dramatic shift in the perception of risk around the announcement of the 2007 verified emissions. Among the studies using event study methodology to analyze the impact of verified emissions announcements on

Download English Version:

<https://daneshyari.com/en/article/6683213>

Download Persian Version:

<https://daneshyari.com/article/6683213>

[Daneshyari.com](https://daneshyari.com)