IMPACT OF CARBON PRICES ON CORPORATE-SPECIFIC VALUE： THE CASE OF CHINA'S THERMAL LISTED ENTERPRISES

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Overview

This paper investigates the influences of carbon prices of different pilots in China on thermal listed enterprises value and what extent of the impact. VAR (vector auto regression model) has been used to test if there is a correlation between thermal listed companies' stock return and carbon price changes in China. Firstly, we analyze the impact with daily data. Secondly, a comparison study of influence from phase I to phase III has also been measured. Thirdly, robustness analysis has been carried out using weekly data.

Methods

In order to explore the possible causal relationship between carbon price and listed power enterprises performance, we employ Vector Auto Regression (VAR) models. The initial model is as follow:

$$y_t = \partial_0 + \partial_0 y_{t\text{-}1} + \cdots + \partial_n y_{t\text{-}n} + \varepsilon_t, \quad (2)$$

where y_t is the dependent variables in this equation, and n means the lag period. In this paper, we use the VAR developed model combining as follows:

$$R_{jt} = \partial_j + \sum_{i=1}^{n} \beta_i R_{jt\text{-}i} + \sum_{i=1}^{n} \delta_i R_{ct\text{-}i} + \varepsilon_{jt}, \quad (3)$$

$$R_{jt} = \partial_j + \sum_{i=1}^{n} \beta_i R_{jt\text{-}i} + \sum_{i=1}^{n} \delta_i R_{ct\text{-}i} + \phi R_{ot\text{-}i} + \varphi R_{gt} + \theta R_{coalt} + \omega R_{mt} + \varepsilon_{jt}, \quad (4)$$

in formula (3), the control variables are not into account, while in formula (4), they are added. For the above formula, R_{jt} is the stock return of the j corporation on period t. R_{ct-i}, R_{ot} , R_{gt} , R_{coalt} , R_{mt} are the appropriate explaining variables means carbon price return (for the corresponding pilot carbon market), oil price return, gas price return, coal price return and capital market return. ∂_j, β_i , ϕ, φ, θ and ω are the corresponding parameter would be estimated in the equation. $\varepsilon_{jt}$is the disturbance error. The statistical significance and the estimated sign of δ_i would reflect the relationship between carbon price return and corporation values.

Results

The results indicate that the impact of carbon markets on electricity listed enterprises' value is not obvious. What's more, comparing the first two phases, the influence in phase III is more significant. The results demonstrate the effects are firm-specific， specifically, the effects of different enterprises in different phases are various. Thirdly, we find significant interaction effects between lagged returns and carbon price return by inducing an interaction term of past returns and carbon price changes into the model.

Conclusions

By estimating the effect from phase I to phase III, we can conclude that the effect of carbon market has changed. Firstly, the relationship between carbon market and stock value is more markedly in phase III. Unlike EU ETS, the relationship between carbon price changes and electricity generation stock returns is unstable and not significant (Tian et al., 2016). The primary reason is the carbon markets in China are not mature and improving gradually. China's carbon market pilots only experience about three years. Thus, the mechanism and allocation methods are imperfect. What's more, the interaction term significant affect stock value in all three phases. In addition, the influences of carbon markets on stock value are different among the firms in different phases. This suggests that the extent of carbon market effect on thermal listed companies is firm specific. Companies in Shanghai, Guangdong and Beijing are much more easily influenced by carbon prices changes. Carbon pilots are not only regulated by the national development and reform commission (NDRC) but also take orders from local regional government. On one hand, the carbon market pilots in above three areas regulate better with more reasonable mechanisms. And one the other hand, the companies' in these areas take more seriously on mitigating emissions.

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