China's Environmental Protection, Green Industry and Policy Impact

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Abstract. Environment is the prerequisite for human survival and development, a good environment can provide the necessary resources for the development of the society. With the development of society and the progress of economic, the need for a well ecosystem is also increasingly urgent. Our country has issued a series of environmental policies to promote environmental protection. Under this circumstances, corresponding environmental protection industry and green industry came into being, the emergence of these industries will be able to turn the environmental problem which are difficult to quantify into the market mechanism way, and can also ensure the efficiency of environmental improvement. However, the impact of environmental policies is difficult to measure. This paper uses the event analysis method to analyze the short-term impact to environmental protection and green industry of three environmental policies: Water pollution prevention action plan and Soil pollution prevention action plan. And measure the impact of events through the "abnormal fluctuations" in the event window of the two events. Taking this as an example to analyze the effect of environmental policy. Results show that, in the short -term Water pollution prevention action plan plays a restraining role in environmental protection industry and green industry, Soil pollution prevention action plan plays a promoting role in them.

Introduction

Environment is the prerequisite for human survival and development. A good environment is a guarantee of social progress. In order to achieve the sustainable development of human society, we must pay attention to the construction of ecological civilization, so we must achieve green and low-carbon development [1]. China is a great country which has a long - term dependence on coal resources in the economy. It is a self-evident that environmental protection industry and green industry has play a significant role in China’s economic evolvement. Its growth can not only promote the development of China's economy, but can also protect the existing ecology effectively, promote economic restructuring, provide more jobs, and can enhance the level of scientific and technological evolution [2,3,4]. In order to further encourage the development of environmental protection industry green industry, China has established the goal of building an environment-friendly and resource-saving society, and the establishment of this goal will elevate the environmental management work to the height of a country's overall development strategy.

Meanwhile, the impact of the environmental policy changes on the environmental protection industry and the green industry management is much more difficult to predict. On the one hand, it continues to improve the requirements of enterprise's technological evolution, which increases the cost of the enterprise [5-7]. This may lead to the contraction of the size of the enterprise and has a negative constraint for the development of enterprise. On the other hand, environmental policies also provide protection for the development of the industry and raise the barriers of other enterprises to enter the relevant industries to promote its development [7-10]. These two aspects of the interaction make it

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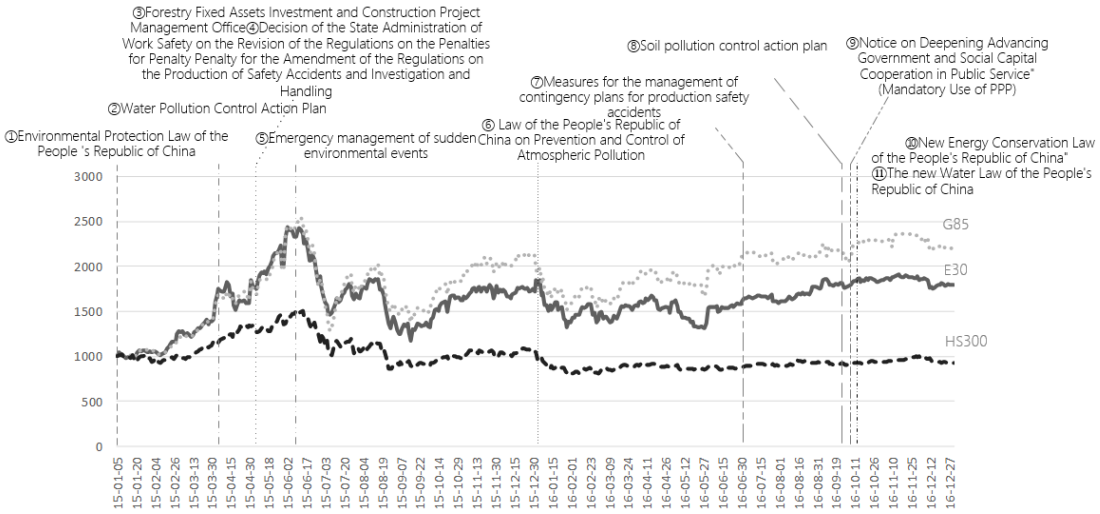
difficult to predict the response of environmental protection industry and the green industry for environmental policy changes accurately. This is also the reason why this paper uses the event analysis method to carry on the empirical analysis.

The paper proceeds as follows. Section 1 provides an introduction. Section 2 summarizes the data and environmental policies, Section 3 discuss the research design and the econometric methods used to implement this design. Section 4 presents the empirical findings. Section 5 concludes.

Environmental Policy and Data Sources

Based on the timeliness of the study, the time interval for this paper is from January 4, 2015 to December 30, 2016. This article has a total of 11 relevant laws and regulations. Fig. 1 shows the important environmental policies in this time interval and the changes in the composite index of the green industry and green industry and HS 300 in detail.

Enterprise sample selection based on "2016 China's environmental protection industry boom report: A shares of environmentally friendly listed companies" and "China's green industry prosperity index report". Synthetic environmental protection industry and the green industry composite index of corporate equity data and a total of 152 139 day's trading data from January 4, 2015 to December 30, 2015 trading data come from the Wind database.



Note: type policy for the national level environmental policy, I type policy for environmental protection, green industry level policy. Industrial line for the industry composite index, Shanghai and Shenzhen 300 to January 4, 2015 as the base period for calibration, the picture shows the calibration results.

Figure. 1 Policies regulations and industry trends

Research Design

Basic Assumptions. Event analysis is an empirical method, Ruiqiang Duan [11] believes that the event analysis method is a kind of quantitative analysis method which uses the specific technology to measure the influence of the event according to the data statistics before and after an event occurs. The focus of this paper is to analyze the implementation of environmental policy for the short-term impact on industrial income, so the analysis of the method also selected the event analysis.

In the analysis process, the basic assumptions of this paper: environmental policy as an unexpected event can lead to excessive income industry.

$H_0: CARt = 0$, That the implementation of environmental policy for environmental (green) industrial income has no effect.

$H_1: CARt \neq 0$, That the implementation of environmental policy for the environmental (green) industrial income do have effect.

Where $CARt$ represents the cumulative excess rate of return in the event window.

Window settings. In the selection of the window, we agree with Nicolas Koch [12] on the estimated window selected in the study of the impact of the national innovation policy on the high-tech industry. Selected from the two months to one and a half months before the policy implementation, that is [-60, -45]. We use the rate of return on the business during the event window as a basic. Taking into account the limitations of event analysis, if the selected event window is too long, then you cannot rule out the impact of other factors on the income, so the choice of the event window should not be selected too long. In addition, since the data used in the analysis process are daily data, the event window selected during the analysis is [-5,5], Among them, the implementation of the policy for the day of the incident, that is, "0" day situation, the event occurred before the transaction for the "-1" situation, the event after the first trading day as "1" day situation.

Parameter Estimation. The market model is a linear regression model, assuming that the observed value t in any securities i and event estimation window [-60, -45] satisfies the following regression model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

Where α_i is the intercept term, $\beta_i$is the coefficient term, $R_{it}$is the yield of stock i on day t, and $R_{mt}$is the market rate of return on day t.

By introducing the estimated window data into the market hypothesis model Eq. 1, can get the following estimated parameter matrix：

Table 1 Estimation parameter matrix

Policy / Industry	"Water 10" (W)	"Soil 10" (S)
(E)	$(\alpha_i^{W_E}, \beta_i^{W_E})$i=1,2…30	$(\alpha_i^{S_E}, \beta_i^{S_E})$i=1,2…30
(G)	$(\alpha_i^{W_G}, \beta_i^{W_G})$i=1,2…85	$(\alpha_i^{S_G}, \beta_i^{S_G})$i=1,2…85
(W)	$(\alpha_i^{W_w}, \beta_i^{W_w})$i=1,2…31	——

Note: $(\alpha_i^{W_E}, \beta_i^{W_E})$, for example, $(\alpha_i^{W_E}, \beta_i^{W_E})$ for environmental protection enterprise i in the "water 10" event estimation window Parameter, environmental protection enterprises, for example, a total of 30 environmental protection enterprises, so i = 1,2 ... 30.

On this basis, calculate the normal rate of return ($NRit$), extraordinary rate of return ($ARit$), average extraordinary rate of return ($AARt$) as well as the cumulative extraordinary rate of return ($CARt$). Based on the basic hypothesis proposed in this paper, we then calculate the t value.

Empirical Test Result

Analysis on the Results of the "Water 10". In this paper, the average transcendent yield, the cumulative normal yield and the t value of each industry are listed in each event window. The test results of the environmental protection industry are shown in Table 2 and Fig. 2.

The results of Table 2 and Fig. 2 can be seen, in the first trading day after the event of "water 10", the environmental protection industry showed a 5% level of negative cumulative excess rate of return. This presents that the implementation of "water 10" has put pressure on the operation of environmental protection industry, in the short term, it does dampen the investment confidence of investors, formed binding effect.

Table 2 Calculation results of environmental protection industry

Time	AARt	CARt	T value
-5	0.000	0.000	-0.010
-4	0.002	0.002	0.851
-3	0.001	0.003	1.091
-2	-0.002	0.000	0.210
-1	-0.002	-0.001	-0.525
0	0.000	-0.001	-0.510
1	-0.005	-0.006	-2.135*
2	-0.003	-0.010	-2.155*
3	-0.001	-0.010	-2.590*
4	-	-0.0118	-3.354**
5	-	-0.0123	-

Note: * represents significant level of 10%, ** represents a significant level of 5%, and *** represents a significant level of 1%.

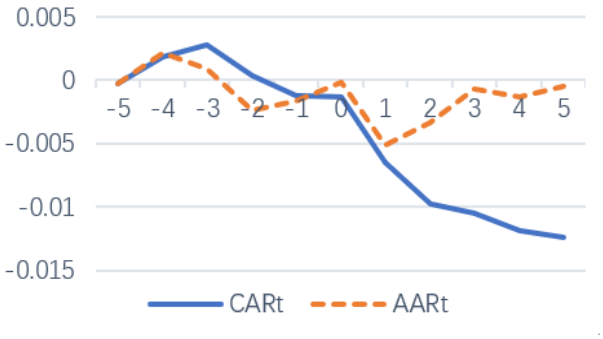


Figure. 2 Results of the environmental protection industry on "water 10"

Analysis on the Results of the "Soil 10". Consistent with the above analysis process, this paper continues to test and analyze the cumulative excess returns of the environmental protection industry and the green industry during the event window of "soil 10". The test results are shown in Table 3 and Fig. 3.

Table 3 The calculation results of Environmental protection industry, green

Time	AARt (E)	CARt (E)	T value (E)	AARt (G)	CARt (G)	T value (G)
-5	0.007	0.007	0.383	0.049	0.049	1.667**
-4	0.002	0.008	2.862***	0.030	0.079	4.486***
-3	-	0.008	3.083***	0.033	0.112	5.973***
-2	0.002	0.009	3.406***	0.033	0.145	0.705*
-1	0.001	0.011	4.051***	0.016	0.161	2.876***
0	-	0.008	1.813**	0.012	0.173	6.004***
1	-	0.007	1.644*	0.068	0.240	4.343***
2	0.136	0.143	8.056***	0.075	0.315	1.964**
3	-	0.141	5.294***	0.044	0.359	8.623***
4	-	0.140	5.295***	0.036	0.395	9.190***
5	0.000	0.140	5.340***	0.040	0.435	8.954***

Note: * represents significant level of 10%, ** represents a significant level of 5%, and *** represents a significant level of 1%.

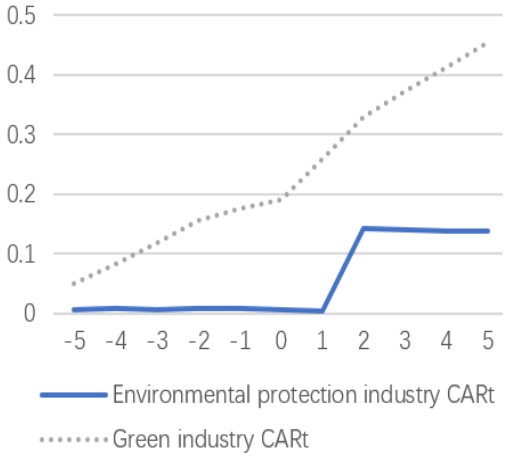


Figure. 3 Comparison of environmental industry and green industry

Table 3 and Fig. 3 show that since the fourth trading day before the implementation of "soil 10", the environmental protection industry has been showed a positive cumulative excess rate of return, and it is significantly in the 5% level. With the implementation of the policy, the significant degree is also rising, indicating that the implementation of "soil 10" didn't put a pressure on the environmental protection industry, on the contrary, it enhanced the confidence of investor to invest this industry. Similarly, the implementation of the "soil 10" policy has had an upward stimulus to the benefits of the green industry, and since the fifth trading day before the implementation of "soil 10",the role has been significantly in statistics at the 1% level. With the implementation of the policy, the cumulative excess

returns continue to rise, and its significant degree is also increasing.

Conclusion

In the short term, China's environmental policy promulgation does affect the environmental protection industry and the green industry income, the promulgated of the policy do have impact on investor's beliefs, thus affecting the enterprise's earnings situation. But the long-term effect of environmental policy on economic development is still unable to find a suitable method to measure, which is one of the shortcomings of this study. This paper also validate that different policies' scope and extent of impact are different. "Water 10" for the environmental protection industry, as well as the green industry have a binding effect, "soil ten" on the environmental protection industry and the green industry have a stimulating effect.

Through the analysis of this paper can also remind policymakers to ensure that the impact of policy, but also need to strengthen the following work. (i)Strengthen the implementation of policies to promote policy landing, which is the effective prerequisite and basis of the policy. Only on this way, can the expected effect be achieved. (ii)Strengthen the supervision and auditing to promote the effect of the policy, which is the guarantee of the policies' correct role. (iii)Strengthen the supporting facilities and financial instruments, which is the resolution channel of problems.

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