



Study on the Influence of the Improvement of Environmental Charge System on Accounting Information Quality——Quasi-natural Experiment Based on Data and Statistical Analysis Tools

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Abstract. In 2018, China officially implemented the Environmental Protection Tax Law of the People's Republic of China. Compared with the collection of sewage charges, the level and rigor of environmental protection tax are further improved, which means that the environmental protection charge system is more perfect. Taking the listed companies whose A-share tax burden has increased in the stock market from 2015 to 2020 as the experimental sample and the listed companies whose tax burden has shifted as the control sample, the DID method is used to measure the influence of the above system improvement on the quality of accounting information. The results show that the change of environmental protection fee to tax has a significant negative impact on the quality of accounting information, especially, the policy has a more significant negative impact on non-state-owned enterprises. The above results indicate that the policy of replacing environmental protection fee with tax still needs further improvement, so as to promote the improvement of accounting information quality of enterprises and realize the green development of enterprises.

Keywords: Environmental Protection Fee To Tax · Accounting Information Quality · DID

1 Introduction

Achieving green and sustainable development is China's long-term economic and social development strategy, and it is also the core purpose of China's formulation and implementation of its environmental governance policy system. As an important part of this policy system for a long time, the sewage charging system has played an important role in reducing pollution, so China is constantly reforming this system. On January 1, 2018, China officially implemented a new environmental protection tax law, which adjusted the charging method from sewage charges to environmental protection tax. This reform measure has promoted green and sustainable development [1].

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Accounting information is an important source of information that investors rely on when making investment decisions. Based on capital market transaction motivation and signaling theory, high-quality accounting information can alleviate adverse selection and moral hazard, thereby reducing investor insecurity.

In order to reduce the impact of the implementation of the Environmental Protection Tax Law on the normal operation of enterprises, the principle of shifting the amount of sewage charges to the environmental protection tax should be followed when implementing the Environmental Protection Tax Law. The total amount of charges only adjusts the method of environmental charges. This means that the legal level of environmental protection charges has been raised, the standardization and rigor of collection has been improved, and the possibility of paying rent-seeking fees has been systematically reduced, thereby improving the quality of accounting information. However, at the same time, the change of pollution discharge fee to environmental protection tax will increase the tax burden and shift the tax burden for enterprises.

The research contribution of this paper is: with the help of the “Environmental Protection Tax Law”, a quasi-natural experiment implemented in early 2018, the DID method is used to test the impact of the fee-to-tax policy on the quality of accounting information, and to verify the economic consequences of the environmental protection fee-to-tax policy at the enterprise level. The response of enterprises to changes in environmental regulations provides a theoretical basis for the further improvement and promotion of China’s environmental protection policies. Examining the heterogeneous impact of environmental protection tax policy on the quality of environmental information disclosure from the aspect of property rights can more reasonably evaluate the net effect of the policy of changing fees to taxes.

2 Literature Review

To curb environmental pollution in the form of taxes or charges, its economic theory is based on Pigouvian tax, which internalizes the external cost of environmental pollution, thereby balancing the private and social costs of enterprises.

For the environmental fee reform policy implemented in 2018, scholars mainly focus on its role in promoting innovation and corporate performance. The promotion of this system has effectively improved corporate innovation efficiency [2, 3], which in turn increases corporate performance [4]. Relevant studies have further improved the effectiveness and consequences of policy reforms, but there is less analysis on the quality of enterprise information. Although the fee-to-tax policy does force companies to innovate green, it is not clear whether the quality of corporate information has been improved or whether it has been negatively affected.

How to improve the quality of enterprise accounting information has always been the concern of scholars. In the existing literature research on the change of pollution discharge fee to environmental protection tax, the analysis is mainly based on the quality of environmental information disclosure. Kong Dongmin (2021) found that the change of environmental protection fee to tax has a significant negative impact on the quality of corporate environmental information disclosure, which means that the quality of accounting information. Contrary to this, Tang Rong (2021) verified that the implementation of environmental protection tax has improved the quantity and quality of corporate

environmental information disclosure by analyzing the performance of corporate environmental information disclosure before and after the implementation of environmental protection tax. Since this reform has only been implemented for more than three years, and the impact of the epidemic in 2020 has made the relevant effects not significant, the economic consequences of this reform remain to be studied.

3 Institutional Background and Research Assumptions

The payment of environmental taxes and information disclosure will have a certain impact on the value of enterprises. Senior executives often solve related problems through gray channels, such as offering bribes to regulatory agencies. As long as the gray fees such as bribes are lower than the legal compliance costs, such investment is Cost-effective. Moreover, by paying such gray fees to regulators, it can also strengthen the communication and exchanges between enterprises and regulators, which can be said to kill two birds with one stone. In order to cover up rent-seeking behavior, companies have incentives to manipulate accounting information, reduce the quality of financial reports, and increase the degree of information asymmetry in companies [5]. According to existing research, the reform has a negative impact on corporate environmental information disclosure [6], thereby reducing the quality of accounting information. Based on this hypothesis:

H1: The improvement of the environmental protection fee system has a negative impact on the quality of accounting information.

In terms of system design, business objectives, and management policies, state-owned enterprises pay more attention to their own legitimacy, and their value system is consistent with China's socialist system. Therefore, SOEs attach great importance to social responsibility, pay more attention to environmental benefits, and are less motivated to evade the performance of environmental protection responsibilities [7]. On the contrary, non-state-owned enterprises pay more attention to economic benefits than state-owned enterprises. In the face of environmental protection and economic benefits, most non-state-owned enterprises may evade environmental protection responsibilities by reducing the quality of environmental information disclosure. Hypotheses based on this:

H2: Compared with state-owned enterprises, the "reform of environmental protection fee to tax" has a significant negative impact on the accounting information quality of non-state-owned enterprises.

4 Study Design

4.1 Data Sources and Sample Selection

The research sample in this paper is the panel data of A-share listed companies from 2015 to 2020. Since the "Environmental Protection Tax Law" was officially implemented on January 1, 2018, this paper regards the 2018 environmental protection fee reform policy as an exogenous impact, based on the implementation situation, the samples were divided into experimental group and control group. Among them, the experimental group is a

sample of enterprises whose tax burden has increased significantly, and the control group is a sample of enterprises whose tax burden has basically not changed (tax burden translation).

In order to ensure the validity of the data, the data are processed as follows: (1) Eliminate enterprises in special processing status (ST, *ST), (2) Eliminate enterprises with serious data missing, (3) Eliminate enterprises with outliers, (4) due to the uncertainty of the financial industry, the financial services industry is excluded, (5) the companies with incomplete sample periods are excluded, and all continuous variables are abbreviated by 1%. The relevant data comes from the CSMAR database.

4.2 Variable Design

Referring to the modified Jones model extended by Lu Jianqiao (1999), the degree of accrual earnings management is used to measure the quality of accounting information. In this paper, the samples are regressed by industry and year. Referring to Wang Fusheng et al. (2014), if the number of sample companies in a certain industry is less than 15, it will be combined with samples from similar industries, and the absolute value of the residuals of the regression model obtained represents the degree of accrual earnings management.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{A_{i,t-1}} + \beta_3 \frac{FA_{i,t}}{A_{i,t-1}} + \beta_4 \frac{IA_{i,t}}{A_{i,t-1}} + \varepsilon_{it} \quad (1)$$

$TA_{i,t}$ is the total amount of accrual items, calculated by subtracting the net cash flow from operating activities from the total profit before deduction; $A_{i,t-1}$ is the total assets of the one lag period; ΔREV_{it} is the change in sales revenue, deducted by the total assets of the one lag period; ΔREC_{it} is the amount of changes in accounts receivable, deflated using the total assets lagging one period; $FA_{i,t}$ is the total fixed assets in year t; $IA_{i,t}$ is intangible assets and other long-term assets in year t. The absolute value of the residuals (ε_{it}) of the regression is the maneuverability accruals.

The explanatory variable of this paper is $Treat \times Period$. If the enterprise is the sample of the experimental group, then $Treat \times Period$ is 0 before the implementation of the environmental protection tax policy, and $Treat \times Period$ is 1 after the implementation of the environmental protection tax policy. Still after implementation, $Treat \times Period$ is all 0 (Table 1).

4.3 Model Design

To test the above hypothesis, the following regression model is estimated:

$$DACC_{it} = \beta_0 + \beta_1 Treat_{it} + \beta_2 Period_{it} + \beta_3 Treat_{it} \times Period_{it} + \beta_4 controls + \sum IND_{it} + \varepsilon_{it} \quad (2)$$

where i represents the company and t represents the year.

Model (2) uses OLS regression, controls for industry fixed effects, and makes a firm-year-level cluster adjustment for standard errors. If the $Treat_{it} \times Period_{it}$ coefficient of

Table 1. Variable Definitions and Measurements.

Variable type	Variable Name	Definition	Computational Method
Explained variable	DACC	Accrual Earnings Management	Calculated using the modified Jones model proposed by Dechow (1995)
Explanatory variable	Period	time grouping variable	1 if 2018 and later, 0 before 2018
	Treat	experimental grouping variables	If the enterprise belongs to the tax-improving industry, it is 1, and the tax-burden shifting industry is 0.
Control variable	ROA	Profitability	Net profit/average balance of total assets
	<i>MVE</i>	Corporation value	(Market value of equity + book value of liabilities)/book value of total assets
	Growth	development ability	Year-on-year growth rate of operating income
	Lev	financial leverage	Assets and liabilities
	Size	Enterprise size	Natural logarithm of total assets at the end of the period
	Top1	Ownership concentration	Shareholding ratio of the largest shareholder
	<i>IDR</i>	Proportion of independent directors	The ratio of the number of independent directors to the total number of directors
	Dual	Duality	1 if the chairman concurrently serves as the general manager, and 0 if the chairman does not serve both concurrently.
	PR	Ownership property	The actual controller type is 1 when the SASAC, Ministry of Finance and other central agencies and central enterprises, and 0 otherwise.

the multiplication term of model (2) is significantly positive, it indicates that the reform of the environmental protection fee system will promote the enterprise to carry out earnings management, which will have a negative impact on the quality of accounting information, that is, to verify the hypothesis 1.

5 Analysis of Empirical Results

5.1 Descriptive Statistics

Table 2 reports the descriptive statistical results of the variables. The mean value of accrued earnings management of sample companies is 0, but the maximum value is 2 and the minimum value is -1 . The regulatory authorities should take further measures. Using the double difference method for model regression, whether it is a period variable or a policy variable, it is in a state of equilibrium. The mean value of the Treat dummy variable is 0.417, indicating that 41.7% of the enterprises in the sample are located in the provinces where environmental protection fees have been changed to tax.

The average return on total assets of the sample companies is 3.8%, the average market value is 2.14, and the average growth rate is 74.6%. Other indicators are basically in line with the financial status of the operating companies. However, the standard deviation of corporate growth rate and equity concentration is relatively large, indicating that there are large differences in the operation and equity structure of various companies in the capital market.

5.2 Multiple Regression Analysis

The previous theoretical analysis has obtained a preliminary conclusion on the impact of the improvement of the environmental protection charging system on the quality of

Table 2. Descriptive Statistics.

	N	Mean	SD	Min	P25	Median	P75	Max
DACC	13900	0.000	0.094	-1.024	-0.040	-0.001	0.041	2.058
Period	13900	0.501	0.5	0	0	1	1	1
Treat	13900	0.417	0.493	0	0	0	1	1
ROA	13900	0.038	0.075	-1.648	0.016	0.037	0.066	0.542
MVE	13900	2.14	1.883	0.69	1.242	1.652	2.406	86.5
Growth	13900	0.746	8.689	-3.036	-0.009	0.154	0.453	434.600
Lev	13900	0.418	0.200	0.008	0.260	0.409	0.562	1.800
Size	13900	22.35	1.333	18.37	21.41	22.17	23.07	28.54
Top1	13900	34.07	14.67	0.29	22.81	32.06	43.62	89.99
IDR	13900	0.377	0.055	0	0.333	0.364	0.429	0.8
Dual	13900	0.281	0.449	0	0	0	1	1

Table 3. Test Results of Regression.

VARIABLES	(1)	(2)	(3)	(4)
	DACC _{i,t}	DACC _{i,t}	DACC _{i,t} state-owned enterprise	non-state enterprise
Period _{i,t}	0.0023 (1.45)	0.0056*** (3.44)	0.0044* (1.72)	0.0049** (2.33)
Treat _{i,t}	-0.0028* (-1.65)	-0.0025 (-1.46)	0.0009 (0.34)	-0.0048** (-2.22)
Period _{i,t} *Treat _{i,t}	0.0041* (1.68)	0.0040* (1.69)	-0.0001 (-0.03)	0.0069** (2.26)
Constant	0.0602*** (50.19)	0.1188*** (8.38)	0.0806*** (3.69)	0.1165*** (5.64)
Observations	13,900	13,900	4,822	8,777
R-squared	0.0249	0.0637	0.0674	0.0652
Industry FE	YES	YES	YES	YES
F	5.303	28.79	7.402	23.35

Robust t-statistics in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

accounting information, but it is not certain whether a specific functional relationship can be established between these two variables. Therefore, the double difference method is used to perform linear regression on the above variables.

Table 3 reports the regression results of the impact of changing pollution charges to tax on accounting information quality. Column (1) is the average impact of changing sewage charges to taxes on the quality of accounting information when no control variables are controlled. The multiplication item Period*Treat coefficient concerned in this paper is 0.0041 and is significant at the 10% level, indicating that sewage charges The system reform of tax reform has increased the degree of earnings management of enterprises, which has a negative impact on the quality of accounting information. H1 has been initially verified. Column (2) reports the regression results under the control of related variables, the Period*Treat coefficients are still positively significant at the 10% level, further supporting the hypothesis H1. According to the nature of property rights, this paper divides enterprises into two categories: state-owned enterprises and non-state-owned enterprises. Table 3 reports the regression results. Columns (3) and (4) are the regression results of different property rights, respectively. The results show that the coefficient of the non-state-owned enterprise interaction term Period*Treat is positive and significant at the 5% level, and the coefficient of the state-owned enterprise interaction term is The negative effect is not significant, and the H2 of this paper is verified, which shows that after the implementation of the policy, state-owned enterprises still pay attention to the quality of accounting information, and do not carry out earnings

management to improve performance; non-state-owned enterprises may choose to evade social responsibility by reducing the quality of accounting information. All four-column regressions control for industry fixed effects and make cluster adjustments for individual years.

6 Conclusions and Implications

In the short term, the environmental protection fee-to-tax policy has a negative impact on the quality of corporate accounting information; considering the nature of property rights, the fee-to-tax policy has a significant negative impact on non-state-owned enterprises, but has no significant impact on state-owned enterprises. “Environmental protection tax”, as an important measure of China’s environmental protection cause, changes administrative behavior into taxation behavior. Its purpose is to guide enterprises to improve accounting information and force enterprises to assume social responsibilities.

Based on the above analysis, this paper puts forward the following policy recommendations: the government needs to make enterprises improve the quality of environmental information disclosure from both active and passive aspects. By strengthening the construction of the accounting information system, it is forced to increase its emphasis on environmental protection, so as to achieve the purpose of implementing environmental protection tax.

This study has certain limitations. Due to the short period of implementation of the environmental protection fee-to-tax policy, the period of observation in this paper is from 2015 to 2020, and only the short-term impact of the fee-to-tax policy can be observed, and the impact is significantly negative. With the passage of time and the implementation of the policy, the effect of the policy needs to be tested in the long run, which is a future research direction.

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