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Research on Correlation between Internal control and Earnings Management of Electric Power Listed Companies

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Abstract: This article uses the financial data of listed A-share electric power companies from 2014 to 2018 as the research sample, uses the extended Jones model to quantify the level of earnings management of the company, and explores internal control and accrued earnings management and real activities through multiple regression analysis of the sample Earnings management relationship, the results show that: listed electric power companies generally have earnings management behavior, accrued earnings management and real activity earnings management have a complementary relationship, there is a significant negative correlation between internal control and earnings management, good internal control has a strong binding effect on the company's accruals and real activity earnings management behavior, and internal control has a better restraining effect on positive accrued earnings management and negative real activity earnings management.

Keywords: Listed electric power companies, Internal control, Earnings management, Correlation

INTRODUCTION

The information asymmetry caused by the difference between the objectives of the owner and the manager under the background of the separation of the "two rights" provides space for the implementation of earnings management. Excessive earnings management is likely to evolve into financial fraud. Internal control runs through the entire production and operation process of an enterprise, and one of its goals is to ensure the authenticity and reliability of financial information. The power industry is not only the basic energy industry in China's economy, but also the support of related industries. Its fixed assets have a large proportion. More than 80% of the investment is concentrated in fixed assets with poor liquidity. Due to operating performance and other reasons, companies have manipulated surpluses. In this context, this paper studies the relationship between internal control and earnings management of listed electric power companies, helps listed electric power companies improve their internal control levels, reduces earnings management from the perspective of internal control, and maximizes corporate value.

The promulgation of SOX law limits managers' earnings manipulation by using the selectivity and flexibility of accounting policies, and then turns into the use of real earnings management with better concealment [Cohen, et. al., 2007], When there are more defects in internal control, the company has more abnormal earnings, and correcting the defects of internal control can restrain earnings management [Ashbaugh-Skaife, et. al., 2008]. Managers usually choose earnings management from the end of the year to the release of financial statements, but real earnings management can be carried out at any time, so managers prefer real earnings management [Zang, et. al., 2012]. Managers will actively change accounting principles due to major defects in internal control. Managers believe that voluntary change is to improve accounting information, comply with internal policies and provide administrative benefits [Keune M B, et. al., 2018].

High quality internal control can effectively inhibit the company's accounting choice and real activity earnings management [Fang Hongxing, et. al., 2011], the inhibition of real earnings management is weak [Fan Jinghua, et. al., 2013], while some studies believes that the improvement of internal control quality has nothing to do with earnings management, high-quality internal control not accompanied by a high-quality surplus [Zhang Guoqing, 2008]. Companies with defects in internal control will be accompanied by a higher degree of accrued earnings management and real activity earnings management, after the defects are corrected, the levels of both earning management will be reduced [Ye Jianfang, et. al., 2012]. The improvement of the quality of internal control can reduce the company's behavior of inflating profits through upward earnings management, which in turn reduces the on-job consumption of managers [Shi Yizhou, et. al., 2017]. High-quality internal control can inhibit the accrued earnings management behavior of power executives, but it will induce real earnings management [Luo Shanmei, et. al., 2019].

RESEARCH HYPOTHESIS

Internal control and accrued earnings management

In the contemporary corporate governance structure, due to the separation of ownership and

management rights, a principal-agent relationship has been created, and imperfect contracts have induced problems such as information asymmetry and adverse selection. The goal of internal control is to ensure the integrity and safety of assets and the authenticity and reliability of financial reports. Based on the theory of signal transmission, managers with information advantages cover up real operating performance for earnings management in order to transmit good information. Accounting chooses earnings management to manipulate accrued profits through accounting methods while complying with accounting standards. The accrual part is used to adjust earnings, such as changing accounting policies and accounting estimates to achieve inter-period adjustment of earnings. High-quality internal control can restrain managers' opportunistic behaviors in process design, reduce opportunities for companies to manipulate earnings through accounting choices and misstatements during accounting treatments, and can fully monitor the business process of the company and improve finances the quality of reports and the reliability of related information. Accordingly, this article proposes the following assumptions:

H1: There is a negative correlation between the internal control of listed electric power companies and the management of accrued earnings.

Internal control and real activity earnings management

With the establishment of an internal control system and increased external supervision, litigation risks have increased, the space for manipulation of accrued profits under traditional methods has become smaller, and manipulation costs have increased. Therefore, companies favor earnings management from real activities that are not easily scrutinized. The company's normal business activities are separated, so the supervision is more difficult. The management achieves current business objectives or tax avoidance by constructing related transactions, changing the time, nature and content of transactions and other real-life earnings management methods that are out of normal business activities, which can directly trigger changes in cash flow and cause substantial damage to the company. High-level internal control can promote the improvement of the quality of financial report information, and can also prevent the occurrence of improper sales, production, and expenditures that deviate from normal activities. It is a guarantee for effective business operations. Based on this, this article proposes a second hypothesis:

H2: The internal control of listed electric power companies is negatively correlated with real earnings management.

RESEARCH METHOD

Sample selection and data sources

According to the industry classification of the China Securities Regulatory Commission, this paper selects the Shanghai and Shenzhen listed A-share power listed companies that were listed before 2013 and continued to operate from 2014 to 2018 as the research sample, the financial data of * ST and ST listed companies and the incomplete annual data of sample companies are excluded to achieve information comparability. The selected sample data are all from the Wind database, and the quantitative indicators of internal control are selected from the internal control index published by Shenzhen Dibo Enterprise Risk Management Technology Co., Ltd.

Accrued earnings management measurement

Use manipulable accrued profits to measure accrued earnings management, that is, the difference between total accrued profits and unmanipable accrued profits. This article refers to the extended Jones model to measure the degree of accrued earnings management [Lu Jianqiao, 1999], the specific model is as follows:

$$\frac{TA_{i,t}}{A_{i,t-1}} = a_1\frac{1}{A_{i,t-1}} + a_2\frac{(\triangle REV_{i,t} - \triangle REC_{i,t})}{A_{i,t-1}} + a_3\frac{PPE_{i,t}}{A_{i,t-1}} + a_4\frac{IA_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$$

$$NDA_{i,t} = a_1\frac{1}{A_{i,t-1}} + a_2\frac{(\triangle REV_{i,t} - \triangle REC_{i,t})}{A_{i,t-1}} + a_3\frac{PPE_{i,t}}{A_{i,t-1}} + a_4\frac{IA_{i,t}}{A_{i,t-1}}$$

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t}$$

Among them: $TA_{i,t}$ represents the total accrued profit of company i in the t period, which is the difference between operating profit minus the net cash flow of operating activities; $A_{i,t-1}$is Total assets of company i at the end of period t; $\triangle \mathrm{REV}_{i,t}$is the change in the sales revenue of company i in the t period; $\triangle REC_{i,t}$ is the change in the accounts receivable of company i in the t period Amount; $PPE_{i,t}$ is the net fixed assets of company i at the end of period t; $IA_{i,t}$is the sum of the net intangible assets of company i in t period and long-term deferred expenses; $\varepsilon_{i,t}$is the residual term; $DA_{i,t}$ is the non-manipulative accrued profit of company i in the t period; $DA_{i,t}$is the maneuverability of company i in the t period Accrued profit. Take the absolute value of the manipulable accrued profit DA.ADA measures the degree of accrued earnings management. If the absolute value of ADA is larger, the higher the degree of corporate earnings management is.

Real activity earnings management measurement

This paper is based on the real activity earnings management model studied by Roychowdhury to measure the degree of real earnings management. The model includes manipulative operating cash flow, manipulative production costs, and manipulative discretionary expenses [Roychowdhury S, 2006].

(1) Manipulative operating cash flow model (DCFO)

The actual cash flow from operating activities is subtracted from the estimated cash flow from normal operating activities to obtain the company's abnormal operating cash flow DCFO, and its absolute value

ADCFO is used to measure the degree of sales manipulation earnings management.

$$\frac{CFO_{i,t}}{A_{i,t-1}} = b_1\frac{1}{A_{i,t-1}} + b_2\frac{REV_{i,t}}{A_{i,t-1}} + b_3\frac{\Delta REV_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$$

$CFO_{i,t}$ is the net cash flow from operating activities of company i in the t period; $REV_{i,t}$ is the operating income of company i in the t period.

(2) Manipulative production cost model (DPROD)

The cost of product sales is a linear function of the current year's sales, and the inventory change is a linear function of the previous and current sales changes. The specific model is as follows:

$$\frac{COGS_{i,t}}{A_{i,t-1}} = b_1\frac{1}{A_{i,t-1}} + b_2\frac{REV_{i,t}}{A_{i,t-1}} + b_3\frac{\Delta REV_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$$

$$\frac{\Delta INV_{i,t}}{A_{i,t-1}} = b_1\frac{1}{A_{i,t-1}} + b_2\frac{\Delta REV_{i,t}}{A_{i,t-1}} + b_3\frac{\Delta REV_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

The estimated normal production cost is subtracted from the actual production cost to obtain controlled production cost DPROD. Use its absolute value ADPROD to measure the degree of production cost manipulation earnings management.

$$\frac{PRODT_{i,t}}{A_{i,t-1}} = b_1\frac{1}{A_{i,t-1}} + b_2\frac{REV_{i,t}}{A_{i,t-1}} + b_3\frac{\Delta REV_{i,t}}{A_{i,t-1}} + b_4\frac{\Delta REV_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

$COGS_{i,t}$ is the product sales cost of company i in the t period, $\Delta INV_{i,t}$ is the inventory change of company i in the t period, $PRODT_{i,t}$ is the production cost of company i in the t period, which is the sum of the current operating cost and inventory changes. Other variables are the same as above.

(3) Manipulative discretionary cost model (DDISEXP)

The discretionary expenses are estimated by the sum of the current management expenses and sales expenses of the enterprise, and the absolute value of ADDISEXP is used to quantify the degree of discretionary expenses to control earnings management. $DISEXP_{i,t}$ represents the discretionary expenses of company i in the t period, and other variables are the same as above.

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = b_1\frac{1}{A_{i,t-1}} + b_2\frac{REV_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

(4) Total real activity earnings management (REM)

This article draws on the comprehensive indicator REM used by scholars such as Cohen to measure the total amount of real earnings management from activities, $REM_{i,t}$ is the total amount of real earnings management of company i in the t period, and the real earnings management level is taken as absolute Value gets AREM.

$$REM_{i,t} = DPRODT - DCFO - DDISEX$$

Internal Control Measurement

This article adopts the internal control index issued by Shenzhen Dibo Enterprise Risk Management Consulting Company, which is consistent with the five goals of internal control and can objectively measure the level of internal control. Expressed by IC, the larger the internal control index, the more effective the internal control of the enterprise.

Control variables

In addition to the internal control variables that affect earnings management, earnings management of listed electric power companies will also be affected by other variables that interfere with the results. In order to obtain more reliable empirical results, this article introduces some quantitative indicators through logical analysis and reference to relevant literature research.

Table 1 Variable description and definition

Variable name	Variable identification	Variable description
Company size	SIZE	Natural logarithm of total assets at the end of the period
Asset-liability ratio	LEV	total liabilities/total assets
Return on total assets	ROA	net profit/average balance of total assets
Growth	GROWTH	(This year's operating income-Last year's operating income)/Last year's operating income
Ownership Concentration	TOP1	TOP1 Shareholding ratio of the largest shareholder
Asset impairment loss	AD	Total asset impairment loss/total assets
Net operating cash flow	CFO	Net operating cash flow/Total assets
Board size	BDS	board number

Model construction

Model 1: Internal Control Corresponding Earnings Management Regression Model

$$DA_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 \mathrm{ROA}_{i,t} + \beta_6 \mathrm{GROWTH}_{i,t} + \beta_7 \mathrm{TOP1}_{i,t} + \beta_8 \mathrm{AD}_{i,t} + \beta_9 \mathrm{CFO}_{i,t} + \beta_{10} \mathrm{BDS}_{i,t} + \varepsilon_{i,t}$$

Model 2: Regression model of internal control to real earnings management

$$DREM_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 \mathrm{ROA}_{i,t} + \beta_6 \mathrm{GROWTH}_{i,t} + \beta_7 \mathrm{TOP1}_{i,t} + \beta_8 \mathrm{AD}_{i,t} + \beta_9 \mathrm{CFO}_{i,t} + \beta_{10} \mathrm{BDS}_{i,t} + \varepsilon_{i,t}$$

Among them, β_0 is a constant term, and β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, and β_{10} are various coefficients.

EMPIRICAL ANALYSIS

Descriptive statistics

According to Table 2, we can see that listed electric power companies generally have earnings management behaviors. The maximum value of accrued earnings management index is 1.039, the minimum value is 0, the average value is 0.041, and the standard deviation is 0.083, which reflects the widespread existence of accrued earnings management behaviors in companies and the large differences in earnings management behaviors implemented by companies. The real earnings management level indicator shows that the real

earnings management level of enterprises is higher, and the differences between companies are also large. It may be due to the increasingly stringent internal and external supervision that has reduced the space for implementing accrued earnings management, so some companies have turned to real earnings management. Regarding the three manipulation methods in real earnings management, the degree of manipulation of cash flow from operating activities is the largest, and the degree of discretionary cost manipulation is the smallest. There is a large gap between the maximum and minimum internal control indicators. The overall internal control of sample enterprises is good, but the level of internal control is uneven among enterprises, and the level of internal control and risk management still needs to be improved.

Table 2 Descriptive statistics for the full sample

Variable	Minimum	Maximum	Mean	Standard Deviation
ADA	.00012	1.03852	.0406098	.08293841
ADPROD	.00017	.36225	.0378124	.03907399
ADCFO	.00023	1.17101	.0496417	.07839734
ADDISEXP	.00002	.13196	.0111309	.01555502
AREM	.00005	1.29562	.0808018	.10125755
IC	.00	823.96	609.2671	176.56569

According to figure 1, we can see that the sample companies will use the two earnings management methods at the same time, and the degree of real activity earnings management is greater than that of accounting choice earnings management.

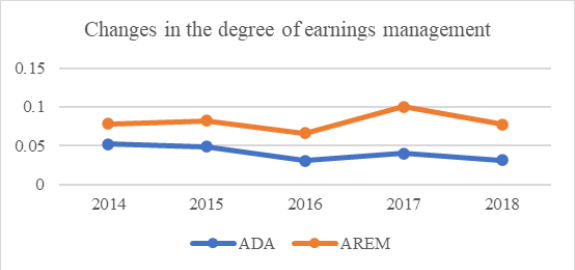

Figure 1 Changes in the degree of earnings management in two ways

Due to the different motivations and influences of earnings management in different directions, the inhibitory effect of internal control may be different. Table 3 is the statistics of the proportions of earnings management:

Table 3 Earnings management statistics by direction

	Accrued Earnings Management	Real Activity Earnings Management
Positive	54%	47%
Negative	46%	53%
Total	100%	100%

It is further found that companies are more inclined to positive accrued earnings management, and they are more willing to conduct negative earnings management from real activities. When most companies are profitable, listed electric power companies have an incentive to manage downward earnings.

Correlation analysis

The Pearson correlation test results show that the correlation coefficient between internal control and accrued earnings management is -0.408, and the correlation coefficient with real activity earnings management is -0.234, both have passed the significance test at the 1% level, Preliminarily judged that internal control is effective in restraining the two earnings management behaviors of the enterprise, the higher the level of internal control, the more effective the inhibition effect is, which is consistent with hypothesis 1 and 2. Accrual and real earnings management are significantly positively correlated at the 1% level, indicating that the two are complementary. In order to achieve the expected purpose, electric power listed companies implement both accrued earnings management and real activity earnings management. The Pearson correlation coefficients between the variables are mostly less than 0.5, and the preliminary judgment is not affected by multicollinearity.

Table 4 Pearson correlation test of main variables

Variable	ADA	ADPROD	ADCFO	ADISEXP	AREM
ADA	1				
ADPROD	.271**	1			
ADCFO	.655**	.393**	1		
ADISEXP	.121*	.098	.093	1	
AREM	.574**	.683**	.901**	.062	1
IC	-.408**	-.175**	-.224**	-.185**	-.234**
SIZE	-.217**	-.062	-.138*	-.346**	-.090
LEV	.168**	.166**	.011	-.018	.045
ROA	-.400**	-.077	.020	-.069	.032
GROWTH	.171**	.101	.432**	-.010	.360**
TOP1	-.094	.121*	.028	-.092	.079
CFO	-.499**	-.087	-.504**	.088	-.403**
AD	.506**	.120*	.005	.081	-.001
BDS	-.021	.012	-.049	-.018	-.035

**. Significantly correlated at the .01 level (bilateral),
*. Significantly correlated at the 0.05 level (bilateral)

Regression analysis

Use SPSS20.0 to carry out regression analysis on the correlation between internal control and earnings management of listed electric power companies.

From Tables 5 and 6, the regression equations of internal control and accruals and real activity earnings management models have a better overall fitting effect. The F-values of the two methods of earnings management are 36.78 and 17.481 respectively, and both have passed the significance test at the 1% level. It can be considered that the regression equation constructed is overall effective and the model has significant statistical significance. The values of DW statistics are all close to 2, and it can be determined that there is no serial autocorrelation problem in the regression model. The VIF value is a variance expansion factor, used to test whether there is a multicollinearity problem between explanatory variables, all of which are less than 5. It can be concluded that the model does not have serious multicollinearity, and does not interfere with the reliability and accuracy of the regression results.

Internal control, accrued earnings management and real earnings management have passed the significance test at the 1% level, and the two are negatively correlated, which is in line with our expected direction, indicating that internal control can inhibit the company's earnings management behavior. Internal control can inhibit the company's accrued earnings management through changes in accounting policies and accounting estimates, and real activity earnings management through the construction of real trading activities. Hypothesis 1 and 2 has been verified.

Table 5 Regression results of internal control corresponding to earnings management

Variable	Standard coefficient	T value	Sig.	VIF
(Constant)		4.338	.000	
IC	-.211	-4.730	.000	1.319
SIZE	-.149	-2.884	.004	1.762
LEV	.000	.007	.994	1.993
ROA	.408	4.710	.000	4.959
GROWTH	.125	2.910	.004	1.224
TOP1	.139	2.863	.005	1.561
CFO	-.439	-9.192	.000	1.508
AD	.720	9.677	.000	3.660
BDS	.149	3.380	.001	1.288
AC	-.055	-1.225	.000	1.355
Adj-R2		54.1%		
F		36.78（.000b）		
DW		1.965		

Table 6 Regression results of internal control on real activity earnings management

Variable	Standard coefficient	T value	Sig.	VIF
(Constant)		3.895	.000	
IC	-.215	-4.062	.000	1.319
SIZE	-.171	-2.784	.006	1.762
LEV	.197	3.020	.003	1.993
ROA	.475	4.621	.000	4.959
GROWTH	.228	4.454	.000	1.224
TOP1	.261	4.516	.000	1.561
CFO	-.429	-7.559	.000	1.508
AD	.193	2.180	.030	3.660
BDS	.096	1.837	.067	1.288
AC	-.084	-1.561	.120	1.355
Adj-R2		35.2%		
F		17.481（.000b）		
DW		2.095		

RESULTS AND CONCLUSIONS

First, electricity listed companies generally have earnings management behaviors, and there is a complementary relationship between accruals and real activity earnings management. Companies will implement these two earnings management methods at the same time to achieve corresponding goals. There is a significant negative correlation between the internal control of listed electric power companies and the management of accrued earnings. High-quality internal control can play a restraining role in the management of accrued earnings. The better the internal control and the higher the quality, the earnings quality will be corresponding improve.

Second, there is a significant negative correlation between the internal control of listed electric power companies and the actual earnings management of activities. High-quality internal control can significantly inhibit the company's actual operating earnings management behavior and provide a reasonable guarantee for the authenticity and reliability of financial statements.

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