A Study of the Impact of Auditors' Industry Expertise on the Sensitivity of Executive Compensation Performance

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Abstract. The article empirically investigates the effect of auditor expertise on executive pay-performance sensitivity and examines the channels and mechanisms of its effect. The results show that auditor expertise significantly enhances executive pay-performance sensitivity, with accounting information quality playing a partial mediating role; further analysis reveals that this effect is more pronounced in state-owned enterprises. The findings of the study enrich the results in the field of factors influencing executive compensation incentives and the governance effect of external audit, and are of practical significance for optimizing the incentive mechanism of executive compensation.

Keywords:auditor industry specialization; salary incentives; accounting information quality; Performance Sensitivity of Executive

1 Introduction

The effectiveness and reasonableness of executive compensation covenants in China are constantly being questioned by the public. Due to the existence of agency conflicts [1], executives have a motive to manipulate accounting performance to obtain high compensation, which will reduce the quality of accounting information of the enterprise, and when the board of directors cannot accurately determine the reliability of accounting performance, it will reduce the executive compensation performance sensitivity. Therefore, auditors, as intermediaries of accounting information of listed companies, are particularly important in evaluating the financial performance of corporate executives, which will affect executive compensation performance sensitivity.

Although domestic and international literature has explored the relationship between auditor's industry expertise and both accounting information quality and executive compensation performance sensitivity, further research is needed on whether and how auditor's industry expertise affects executive compensation performance sensitivity and whether accounting information quality plays a role in the middle.

The contributions of this paper include the following three points: (1) This study provides empirical evidence to understand how auditor expertise enhances executive compensation performance sensitivity via accounting information quality in the Chinese capital market. (2)

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This paper discusses the role of auditors' industry expertise on executive compensation performance sensitivity under different property rights, expanding the channels through which external auditing affects executive compensation performance sensitivity. (3) Executive compensation performance sensitivity is an important criterion for identifying the effectiveness of executive compensation contracts, and this paper incorporates auditor industry expertise into the executive compensation incentive mechanism to provide new ideas for enhancing the effectiveness of executive compensation contracts.

2 Theoretical analysis and research hypothesis

2.1 Auditor industry expertise and performance sensitivity of executive compensation

A principal-agent-based pay-for-performance system can reduce agency costs, and accounting information is often used in executive compensation contracts to analyze corporate performance and executive work intensity because it is standardized, observable, and highly correlated with executive work intensity [2-3]; however, accounting information is susceptible to manipulation by executives. As the gatekeepers of China's capital market, auditors can improve the quality of accounting information in the financial reports disclosed by firms to the public; therefore, shareholders may rely more on financial statements audited by auditors with industry expertise in deciding executive compensation, and place more emphasis on firm performance in deciding executive compensation and evaluating the effectiveness of executive work, which ultimately improves the performance sensitivity of executive compensation.Therefore, this paper proposes H_1: Auditor industry expertise enhances executive compensation performance sensitivity.

2.2 Auditor industry expertise, accounting information quality and executive compensation performance sensitivity

In order to receive higher compensation, managers have incentives to improve accounting performance through surplus management and other means [4] and may involve the choice of auditor's opinion [5]. A high degree of information asymmetry between parties leads to higher transaction costs in concluding executive compensation contracts, and shareholders place less emphasis on accounting performance, reducing the performance sensitivity of executive compensation.

Auditors specializing in a particular industry are able to identify the strategic and operational risks of a firm more effectively because they are frequently engaged in industry-specific auditing engagements. Secondly, because different enterprises in the same industry should be consistent in their choice of accounting policies, but in practice there is a large hidden space, mainly relying on management's personal judgment, which gives management the opportunity to manipulate the accounting surplus of the enterprise. The advantage of auditors with industry experience is that they can better judge which accounting policies are more in line with the characteristics of the industry, more truly reflect the performance of the enterprise, and inhibit the opportunistic behavior of management. Finally, auditors with industry experience have a high reputation and good professional ethics, and in order to maintain their reputation, they will be more proactive in detecting management's manipulation of surpluses and less likely to form audit opinion buying behaviors. Thus, auditors with industry experience have both the

incentive and ability to improve the quality of accounting information, reduce information asymmetry between the two parties, increase the weight of accounting results in assessing management compensation, and thus increase executive compensation performance sensitivity. Therefore, this paper proposes H2: Accounting information quality partially mediates the role of auditor industry expertise in enhancing executive compensation performance sensitivity.

2.3 Auditor industry expertise, property rights nature and executive compensation contract validity

In state-owned enterprises, state-owned shareholders usually hold a large proportion of the enterprise's capital, and even have absolute control over the operating decisions of state-owned enterprises, compared with private enterprises, the lack of ownership of state-owned enterprises has led to internal control problems, and the agency problem is more obvious [6]. The managers of SOEs are mainly appointed by the SASAC, and have stronger motivation for promotion in their work, and are more likely to generate personal interests and "empire building motivation", which leads to a series of surplus manipulation, and the auditor's experience in industry auditing can greatly prevent excessive manipulation by SOE managers. To summarize, this paper proposes H3: For SOEs, the positive effect of auditor's industry experience on the sensitivity of executive compensation to performance is more significant.

3 Research design

3.1 Sample selection and data source

This paper selects A-share listed companies in Shanghai and Shenzhen from 2017 to 2022 as samples, excluding financial companies; ST and ST* companies are excluded; Eliminate the samples with missing data. Finally, the required continuous variables are curtailed by 1% up or down to avoid the influence of extreme values, and finally 18,558 observed values are obtained.

3.2 Definition of variables

1. Explained variables

Executive compensation (Pay) . This article is measured by the increase in the total compensation of the top three executives in the current period, taking logarithm

2. Explanatory variables

(1) Company performance (Perf). This article is measured by the ratio of the increase in the net profit of the current period to the total assets at the end of the previous period.

(2) Auditor Industry Expertise (MSA). This paper refers to the research of Liu Wenjun et al., and adopts the industry market share method to calculate auditor industry expertise. The specific calculation formula is as follows :

$$\mathrm{MSA} = \sum_{j=1}^{J} \mathrm{ASSET}_{ikj} / \sum_{i=1}^{I} \sum_{j=1}^{J} \mathrm{ASSET}_{ikj}$$

$\sum_{j=1}^{J} ASSET_{ikj}$ denotes the market share of auditor i in industry k, and $\sum_{i=1}^{I}\sum_{j=1}^{J} ASSET_{ikj}$ is the sum of the total assets of all firms in industry k.

3. Mediating variable

Accounting information quality (AQ), in this paper, is measured by the absolute value of the degree of management of accrued surplus (DA), and the modified Jones model is used to calculate the degree of management of accrued surplus.The larger the|DA|, the stronger the behavior of manipulating surplus, and the lower the accounting information quality (AQ).

4.Control variables

The control variable definitions covered in this article are shown in Table 1.

Table 1 Table of relevant variable definitions

Variable type	Variable name	Variable symbol	Variable definition
explained variable	Executive compensation	Pay	Logarithmic increase in total compensation of the top three executives for the period
explanatory variable	Company performance	Perf	Ratio of increase in net profit for the period to total assets at the end of the preceding period
	Auditor Industry	MSA	See Model (3-1).
intermediary variable	Accounting information quality	AQ	Take the absolute value of the manipulative accrual DA
control variable	Company size	Size	Take the logarithm of total assets at the end of the period
	Asset-liability ratio	Debt	Ending liabilities/total assets
	Percentage of ownership by ultimate controller	Share	The percentage of the company owned by the ultimate controller (%)
	Percentage of management ownership	MShare	Percentage of the company owned by management
	Proportion of independent directors	Indep	Number of independent directors/total number of directors
	Both roles in one	Dual	Chairman and general manager are the same person 1; Otherwise it is 0
	Degree of separation of	Sep	Difference between the actual controller's percentage of control and percentage of ownership (%)

two weights		
Concentration ofownership	Shrcr	Sum of the top three largest shareholders' holdings (%)
Degree of equity balance	Balance	Sum of shares held by the second to fifth largest shareholders/Number of shares held by the first largest shareholder
Percentage of other receivables	OthRec	Other receivables/total assets at end of period
Auditor reputation	Big4	The company is audited by the Big Four international (PWC, Deloitte, KPMG, Ernst & Young) as 1, otherwise 0
Nature of the company	Soe	The property right nature of the enterprise is 1 for state-owned enterprises, otherwise

3.3 Model construction

In order to study the impact of auditor industry expertise on the effectiveness of executive compensation contracts, this paper first constructs model 1:

$$Pay = \alpha_0 + \alpha_1 MSA + \alpha_2 (MSA * Perf) + \alpha_3 Perf + \alpha_4 Controls + Year + Industry + \varepsilon \quad (1)$$

In model (1), the coefficient α_3 of firm performance (Perf) reflects the firm's executive compensation performance sensitivity, and the interaction term of auditor's industry expertise and firm performance (MSA* Perf) is the core explanatory variable of this paper, and its coefficient α_2 reflects the effect of auditor's industry expertise (MSA) on the performance sensitivity of executive compensation. If H1 holds, then the coefficient $\alpha 2$ of the interaction term (MSA* Perf) of model (1) will be significantly positive.

In order to test H_2, this paper further constructs model (2) and model (3): provided that H1 is proved, the mediation effect is tested as follows.

First, model (2) is used to test the effect of auditor's industry specialization (MSA) on the mediating variable accounting information quality (AQ). If the coefficient $\beta 1$ is significantly negative, it implies that auditor's industry specialization suppresses the extent of firms' surplus management and improves the quality of accounting information.

$$AQ = \beta_0 + \beta_1 MSA + \beta_2 Controls + Year + Industry + \varepsilon \quad (2)$$

Second, AQ and its interaction term with Perf (AQ*Perf) are introduced into model (1) to generate model (3) for regression.

$$Pay = \lambda_0 + \lambda_1 MSA + \lambda_2 (MSA* Perf) + \lambda_3 Perf + \lambda_4 (AQ*Perf) + \lambda_5 AQ + \lambda_6 Controls + Year + Industry + \varepsilon \quad (3)$$

If the coefficient λ_4 of the interaction term (AQ*Perf) in model (3) is significantly negative, it indicates that the higher the quality of accounting information, the higher the performance sensitivity of executive compensation. Meanwhile, if the coefficient λ_2 of the interaction term (MSA*Perf) is not significant, it indicates that there is a complete mediation effect; if λ_2 is

still significant and $\lambda_2<\alpha_2$, it indicates that H_2 holds, and that the quality of accounting information partially mediates the sensitivity of auditor's industry expertise and executive compensation performance.

To test H_3, this paper divides the sample into SOEs and non-SOEs according to the nature of the firms' property rights using model (1) for group regression.

4 Empirical testing and analysis

4.1 Regression analysis

(1) Analysis of the Impact of Auditors' Industry Expertise on the Sensitivity of Executive Compensation Performance

In order to verify the relationship between auditor industry expertise and executive compensation performance sensitivity, this paper regresses model (1), and the results are shown in column (1) of Table 3, the regression coefficient of company performance (Perf) is 0.367, which is significantly positive at the 1% statistical level, indicating that company performance can positively affect the company's executive compensation, and the core explanatory variable (MSA*Perf) is at the 1% statistical level is significantly positive, indicating that auditor industry expertise can enhance executive compensation performance sensitivity, and H_1 holds.

The mechanism of the role of auditor industry expertise in enhancing the performance sensitivity of executive compensation is investigated through model (2)(3). Column 2 shows the test results of model (2), the regression coefficient of auditor's industry expertise (MSA) on accounting information quality (AQ) is -0.02, which is significantly negative at 5% level, i.e., auditor's industry expertise improves accounting information quality. Column 3 is the regression result of model (3), after adding the mediating variable of accounting information quality, although auditor industry expertise and executive compensation performance sensitivity are still significantly positively correlated at the 1% level, the regression coefficient of the core explanatory variable (MSA*Perf) decreases from 2.868 to 2.643, so accounting information quality partially mediates the sensitivity of auditor industry expertise to enhance executive compensation performance, and H_2 holds.

Table 2 Regression results for the sensitivity of auditor industry expertise to executive compensation performance

Variable	(1) Pay	(2) AQ	(3) Pay	(4) Pay non-state enterprise	(5) Pay state enterprise
MSA	0.013 (0.041)	-0.020** (0.009)	0.020 (0.041)	-0.000 (-0.002)	0.033 (0.447)
MSAPerf	2.868*** (0.826)		2.643*** (0.825)	2.267*** (3.629)	5.636*** (4.107)

Perf	0.367*** (0.056)		0.501*** (0.073)	0.392*** (8.194)	0.280*** (2.765)
AQPerf			-0.871** (-2.397)		
AQ			0.191*** (4.926)		
Controls	Yes	Yes	Yes	Yes	Yes
Industry, year	Controls	Controls	Controls	Controls	Controls
N	18558	18558	18558	12978	5580
R^2	0.031	0.062	0.034	0.034	0.033
Experience P-value				0.02	

Note: t-values are in parentheses; *, **, and *** denote 10%, 5%, and 1% significance levels, respectively (below)."Empirical p-values" were used to test the significance of differences in the coefficients of the interaction term (MSA*Perf) between groups, which were obtained by autosomal sampling (Boot-strap) 100 times.

(2) The effect of property property heterogeneity

The sample is divided into state-owned and non-state-owned enterprises according to the nature of enterprise property rights and regressed on model (1) in groups, with the results shown in columns (4) (5) of Table 2. The regression coefficients of the state-owned and non-state-owned cross product terms (MSA*Perf) are both significantly positive at the 1% level, with the regression coefficient of the state-owned enterprise cross product term (MSA*Perf) being 5.636 greater than that of the non-state-owned enterprise interaction term (MSA*Perf), which is 2.267. Applying a Fisher's test for differences in the coefficients between the groups (bdiff), the empirical p-value is 0.02<0.1, which indicates that that the regression coefficient of the cross-multiplier term (MSA*Perf) is significantly different between the two groups. Therefore, the extent to which auditor industry expertise enhances the performance sensitivity of executive compensation is greater in SOEs compared to non-SOEs, and H_3 holds.

4.2 Robustness tests

(1) Explanatory variables lag by one period

In order to mitigate the possible reverse causality problem, this paper regresses model (1)(2)(3) using one-period lagged auditor's industry expertise (L.MSA) and its cross term with firm performance (L.MSA*Perf) as explanatory variables, and the results are shown in columns (1)(2)(3) in Table 3, and the conclusions are consistent with the previous section.

Distinguishing between state-owned and non-state-owned enterprises to regress model (1) on groups, the results are shown in columns (4) (5) of Table 3, the regression coefficients of the cross-multiplier term (MSAhat*Perf) are significantly positive for both state-owned and non-state-owned enterprises, and the empirical p-value of Bdiff test is 0.000, which is in line with the results in the previous section.

Table 3 Robustness test of lagged one period for explanatory variables

Variable	(1) Pay	(2) AQ	(3) Pay	(4) Pay non-state enterprise	(5) Pay State enterprise
L.MSA	-0.019 (-0.411)	-0.025** (-2.460)	-0.013 (-0.291)	-0.0357 (-0.62)	-0.0357 (-0.62)
L.MSAPerf	3.760*** (5.624)		3.481*** (5.624)	1.333** (1.97)	6.912*** (3.93)
Perf	0.768*** (12.191)		0.560*** (13.390)	0.423*** (8.03)	0.272** (2.36)
AQPerf			-1.492*** (-3.757)		
AQ			0.166*** (3.706)		
Controls	Yes	Yes	Yes	Yes	Yes
Experience P-value				0.000	

(2)Instrumental variable method

In order to control the possible problems of omitted variables and endogeneity of mutual causality, referring to the methodology of Li Shu et al [7], this paper adopts one period lagged auditor's industry expertise (L.MSA) as an instrumental variable for auditor's industry expertise, and the regression results are shown in Table 4, the conclusions are in line with the previous section.

Table 4 Robustness test based on instrumental variables approach

Variable	Phase1 (1) MSA	Phase2 (2) Pay	(3) AQ	(4) Pay	Phase2 (5) Pay non-state enterprise	(6) Pay State enterprise
L.MSA	0.814*** (111.934)					
MSAhat		0.001	-0.031**	0.009	-0.044	0.076
		(0.018)	(-2.460)	(0.168)	(-0.629)	(0.770)
MSAhatPerf		2.830***		2.572**	1.967**	9.101***
		(2.657)		(2.422)	(2.450)	(4.321)
Perf		0.359***		0.536***	0.391***	0.169
		(5.424)		(6.335)	(6.869)	(1.331)
AQPerf				-1.172***		
				(-2.926)		

AQ				0.162***		
				(3.568)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Experience P-value					0.000	

5 Research Conclusions and Recommendations

This paper examines the impact of auditor industry expertise on executive compensation performance sensitivity by taking A-share non-financial enterprises in Shanghai and Shenzhen as the research object from 2017 to 2022, with accounting information quality as the mediating variable. The study finds that:(1) Auditor industry expertise enhances executive compensation performance sensitivity. (2) Accounting information quality plays a partial mediating role in the positive effect of auditor industry expertise on executive compensation performance sensitivity. (3) The positive relationship between auditor industry expertise and executive compensation performance sensitivity is more significant in non-state-owned enterprises. Based on the above analysis, this paper makes the following recommendations:(1)Companies should actively engage auditors with industry expertise in their business areas to enhance the sensitivity of corporate executive pay-performance. (2) Integrate the auditor's industry expertise into the executive compensation incentive mechanism in corporate governance to improve the effectiveness of the executive compensation contract.[8-12]

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