SALARY GAP AND OPERATING PERFORMANCE: PERSPECTIVE OF TOURNAMENT THEORY

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ABSTRACT

According to the tournament theory, different hierarchies are paid different salaries. The salary gap between different hierarchies can motivate employees. The empirical data are from the 2005-2009 Survey Report of Audit Firms in Taiwan and published by the Financial Supervisory Commission (FSC). The hierarchy in audit firms is divided into certificate accountant, officer, assistant officer, and assistant. This study investigates the relationship between the salary gap in different hierarchies in the workplace and the operating performance of audit firms in Taiwan. The empirical results are consistent with the tournament theory and show that the salary differences in different hierarchies are statistically and positively related to the operating performance. The salary gap increases with the rise of hierarchies in audit firms. Employees in audit firms obtain promotion opportunities by continuously competing with coworkers. Accordingly, the association between operating performance and salary difference between certificate accountants and officers is the greatest. The salary gap increases with each level of the hierarchy along with promotion incentives for employees.

INTRODUCTION

In a knowledge-based economy, knowledge becomes the primary driving force of productivity improvement and economic development. The maximum value for operating business is from employees' professional knowledge. The knowledge includes explicit and tacit knowledge. Explicit knowledge is easily transferred, but tacit knowledge is not easily transferred (Lane and Lubatkin, 1998; Polanyi, 1967; Teece, Pisano, and Shuen, 1997; Liebeskind, 1996). Tacit knowledge is revealed by application and obtained through practical use (Grant, 1996). The transfer of tacit knowledge is a very slow and complicated process (Teece et al., 1997). Audit firms belong to the knowledge-intensive and labor-intensive industry. The most important input factor is human capital, including employees' professional knowledge and capacity. Most professional knowledge in audit firms is tacit knowledge. Employees obtain important tacit knowledge through learning by doing (Pisano, 1994). New employees bring explicit knowledge into audit firms and establish tacit knowledge by experience. Therefore, investing in training and managing human capital would greatly improve organizational operating performance and productivity (Acemoglu and Pischke, 1999). In theory, human capital can provide economic value for organization (Youndt et al., 1996). However, it cannot be possessed by audit firms because employees can freely transfer to others. Audit firms have to manage and maintain the valued employees (Sveiby, 1997; Edvinsson and Malone, 1997). Therefore, audit firms should eagerly encourage and support those inventive and specific employees. To challenge employees, audit firms should continuously train and educate them. Audit firms should also establish a stimulated system of compensation, reward, and punishment to make employees consistently maintain the high level of inventiveness and uniqueness (Lepak and Snell, 1999).

Employees in audit firms are divided into four levels, including partnership accountants, managers, officers and assistants. Audit firms usually recruit a substantial amount of new professional assistants annually. After 2-3 years, these assistants gain professional experience and may be promoted to officers. With 3-5 years of work experience, officers may then be promoted into managers. After over 5 years of practical experience, managers can become partnership accountants (Elder, Beasley, and Arens, 2008). Audit firms have employment contracts with new employees. These new employees are required to pay a penalty for breaking the agreement if they leave their position before two years of employment. The salary of new employees is not high in audit firms. However, after acquiring experience on the job, these new employees accumulate more professional knowledge and experience in specialized industries and companies. Employers are then willing to pay them a higher salary (Hutchens, 1989). Determining a reasonable salary becomes a very important issue in attracting and retaining employees. According to the tournament theory, if audit firms pay different hierarchies different salaries, the salary gap can motivate employees. The wider the salary gap is for different hierarchies, the broader the ranges of raises are for employees. The objective of this study is to investigate the relationship between the salary gap in different professional hierarchies and the operating performance in audit firms. The remainder of this study proceeds as follows. The subsequent section presents a literature review and hypothesis development, followed by the depiction of research methodology. The next section reports empirical results. Finally, this study discusses and concludes in the last Section.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

When the level of performance of employees can be not observed, the supervision cost for managers to obtain relevant information regarding employees' performance will be too costly. The tournament theory states that employees with different skills can be ranked based on a comparison between his/her performance and that of coworkers. The issue of supervision cost can then be resolved (Lazear and Rosen, 1981). The tournament theory also indicates that when senior managers are risk-neutral they are paid according to their rank-order and individual output. The allocation of resources can then induce the same efficiency (Lazear and Rosen, 1981). Firms can have higher productivity when employees are supervised by those efficient workers. The optimal arrangement for employees is to assign those efficient workers to higher levels and pay them a higher salary (Mayer, 1960; Calvo and Wellisz, 1979). The performance of workers would then be higher (Ehrenberg and Smith, 2000). Salary is increased by a rise in hierarchy. Employees compete with one another in firms to get opportunities for promotion, which is similar to sequential elimination tournaments. In order to motivate excellent employees to devote themselves to their work and to sustain competition in the workplace, the salary gap in firms is extended by a rise in hierarchy. Employees can obtain a higher salary by working hard and being prepared to constantly compete. The salary gap between the second highest and the highest hierarchy is the largest, and they are not promoted often to maintain an intense competition between employees (Rosen, 1986). The practical phenomenon can be explained because different hierarchies are paid different salaries, and employees are motivated by the salary gap. The higher the raise in salary, the more promotion incentives employees have (Lazear and Rosen, 1981).

Regarding the empirical studies of the tournament theory, Main, O'Reilly III, and Wade (1993) assert that in the senior hierarchy, the extension of the salary gap is positively related to the operating performance in firms. Accordingly, the salary scheme designed by the tournament theory can greatly benefit firms. Eriksson (1999) uses the salary data and the personal background of 2600 mangers from 210 firms in Denmark as a research sample. His empirical results suggest that the mean salary gap between CEOs and managers significantly and positively is related to firms' operating performance. Lin and Lu (2009) examine the relationship between compensation gap and firm performance from the 2001-2004 Chinese public listed companies in China. Empirical results indicate that compensation gap between senior executives plays a tournament role and motivates managers to achieve the higher level of performance. However, there is the adverse effect in the tournament theory. Employees might collude clandestinely or

compete excessively due to keen competition with one another. Siegel and Hambrick (2005) investigate the senior hierarchy in technology firms and found that the salary gap is significantly and negatively related to the firms' operating performance in the technology-intensive industry. Therefore, firms should concentrate on group cooperation, employees' assisting with one another, or equal pay to eliminate the vicious competition resulting from the tournament system (Lazear, 1998).

The tournament theory arose out of the labor economics literature more than 30 years ago. Since then, it has expanded to a wide range of other disciplines, such as law (Anabtawi, 2005), ecology (Zabel and Roe, 2009), psychology (Nieken and Sliwka, 2010), and finance (Bothner, Kang, and Stuart, 2007). Lazear and Rosen (1981) propose that the tournament theory can be explained the relationship between compensation gap and performance. The employee compensation remains perhaps the most powerful tool for engineering successful management of human capital and thereby promoting organization effectiveness (Connelly, Tihanyi, Crook, and Gangloff, 2014). However, Gupta and Shaw (2014) review the topics of attention in HRM and find that researches on employee compensation are sporadic and sparse. Furthermore, a study of audit firms from the perspective of tournament theory appears lacked.

Audit firms provide professional services by working group. Members of the working group must eagerly cooperate with one another to provide these services. Audit firms usually pay new employees lower salaries. When these new employees are promoted into a higher hierarchy, they can obtain a higher salary. The hierarchies in audit firms are divided into certificate accountants, officers, assistant officers, and assistants. According to the tournament theory, different hierarchies are paid different salaries. The salary gap between different hierarchies can motivate employees. The wider the ranges of salaries, the more promotion incentives increase for employees. This study predicts that the salary gap between different hierarchies is positively related to the operating performance in audit firms. The hypotheses in this study are as follows:

H1：The salary gap between certificate accountants and other employees positively relates to the operating performance in audit firms.

H2：The salary gap between certificate accountants and officers positively relates to the operating performance in audit firms.

H3：The salary gap between officers and assistant officers positively relates to the operating performance in audit firms.

H4：The salary gap between assistant officers and assistants positively relates to the operating performance in audit firms.

METHODOLOGY

Empirical Model

The structure-conduct-performance (S-C-P) theoretical framework in industrial economics states that market structures affect the firm's behavior and performance (Cowling and Waterson, 1976). Based on the S-C-P framework, this study investigates the relationship between salary gap and operating performance in audit firms and establishes the following cross-sectional regression equation to test our hypotheses.

$$PERFORM = \alpha_0 + \alpha_1 DIF\_N + \alpha_2 HC + \alpha_3 LICENSE + \alpha_4 MKS + \alpha_5 DIV + \alpha_6 CPE + \varepsilon \qquad (1)$$

where,

PERFORM	=	financial performance of audit firms;
DIF_N	=	*DIF_cpaall*, differences in mean salary between certificate accountants and other employees;
	=	*DIF_cpaman*, differences in mean salary between certificate accountants and officers;
	=	*DIF_maninc*, differences in mean salary between officers and assistant officers;
	=	*DIF_incass*, differences in mean salary between assistant officers and assistants;
HC	=	educational levels of employees;
LICENSE	=	percentage of employees with an accounting certification;
DIV	=	degree of business diversification;
MKS	=	audit firm size; and
CPE	=	continuing professional education.

Variable Definitions

Dependent variable: Operating performance: This study defines the operating performance of audit firms as net income, which refers to revenue minus expense in audit firms. The expenses for audit firms include the salary of certificate accountants. However, the criteria for salary payments to certificate accountants vary across firms. In order to reduce such an artificial noise, the salaries of certificate accountants are added back to net income.

Independent variables: Differences in mean salary between hierarchies (DIF_N) This study divides total employees into four categories, including certificate accountants, officers, assistant officers, and assistants in audit firms. The inter-hierarchy wage gap is the mean salary of superior employees minus the mean salary of inferior employees divided by the number of inferior employees. This study establishes the differences between the mean salaries of certificate accountants and other employees (*DIF_cpaall*), the differences between the mean salaries of certificate accountants and officers (*DIF_cpaman*), the differences between the mean salaries of officers and assistant officers (*DIF_manin*), and the differences between the mean salaries of assistant officers and assistants (*DIF_incass*). The wider the differences in the mean salaries are, the higher the salary professionals obtain after receiving a promotion.

Control Variables

Human capital includes the personal ability, knowledge, skills, work experience, educational level, organizational creativity, ingenuity, and innovation of employees and managers (Swanson and Holton, 2001; Mincer, 1974). Bröcheler, Maijoor, and Witteloostuijn (2004) find that higher educational levels of employees improved the operating performance of audit firms. For this study, the length of education is used to determine the educational levels of employees (*HC*). Auditors with an accounting certification are equipped with academic and professional expertise and work experience, a symbol of professionalism. This study estimates the degree of professionalism by the number of auditors with an accounting certification (*LICENSE*). Audit firms also provide non-auditing services to meet their clients' needs. These services include taxation litigation and management consultancy. Therefore, diversity in service lines enhances the firms' efficiencies due to the existence of economies of scope arising from the sharing or joint utilization of inputs (Baumol, Panzar, and Willig, 1982; Markides and Williamson, 1996; Robins and Wiersema, 1995). For this study, Entropy is used to evaluate the degree of business diversification (*DIV*) as follows:

$$DIV = \sum_{i=1}^{5} S_i LOG\left(\frac{1}{S_i}\right)$$

(2)

where,

Si is the ratio of i to the total revenue in audit firms. The database shows that the services of audit firms can be divided into auditing, booking, management consultancy, taxation litigation, and other services. In theory, high Entropy indicates that an audit firm has more diversified levels (*DIV*). Prior studies suggest that the degree of business diversification positively relate to the operating performance in audit firms (e.g., Chen, Chang, and Lee, 2008; Michel and Shaked, 1984). Similarly, this study proposes that the diversified levels of audit firms are positively related to the operating performance. According to the economics theory, market share is positively associated with operating performance (Boulding and Staelin, 1990; Buzzell and Gale, 1987). Therefore, this study asserts that market share (*MKS*) is positively related to the operating performance. Continuing professional education are requirements for auditing professionals in the auditing industry. Auditors can then obtain the least knowledge of accounting, auditing, and taxation in the constantly changing management environment (Elder et al., 2008). The quality of auditing can be improved, and auditors can also meet the requirements of continuing auditing (Whittington and Pany, 2003). Continuing professional education is positively associated with operating performance (Russell, Terborg, and Powers, 1985; Delaney and Huselid, 1996; Creter and Summey, 2003; Nafukho and Hinton, 2003). This study defines continuing professional education as the natural logarithm of the training expenditure of audit firms.

RESULTS

Data

The empirical data are from the "Survey Report of Audit Firms in Taiwan" published by the Financial Supervisory Commission, Executive Yuan, and ranging from the years of 2005 to 2009. Contents of the survey include quantitative information of total revenues and their compositions, total expenses and their compositions, demographics of various levels of employees, and ending amounts of and changes in fixed assets. The Financial Supervisory Commission does not provide uniform serial number of audit firms because of trade secrets. Therefore, the empirical data used in this study are cross-sectional pooled data. The data can lead researchers to maximize the numbers of observations, and the study results can more accurately reflect the average effect of independent variables (Geletkanycz and Hambrick, 1997). This study examines the association between the salary gap of hierarchies and the operating performance in audit firms. The differentials in salary must be positive. The original sample is 4,337. For this study, audit firms employing certificate accountants, officers, assistant officers, and assistants are selected. The final number of observations is 587. They are 103, 112, 118, 133, and 121 in 2005, 2006, 2007, 2008, and 2009, respectively.

Descriptive Statistics

Table 1 illustrates descriptive statistics. The mean salary difference between certificate accountants and other employees (*DIF_cpaall*) is $1,324,442. The mean salary difference between certificate accountants and officers (*DIF_cpaman)* is $1,001,798. The mean salary difference between officers and assistant officers (*DIF_maninc*) is $225,087. The mean salary difference between assistant officers and assistants (*DIF_incass)* is $194,774. Table 2 shows that the mean salary differences increase as the hierarchies rise.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Mini.	Maxi.	Q1	Median	Q3
PERFORM	1,770,690	1,313,760	1,474	10,576,887	990,915	1,446,102	2,111,235
DIF_cpaall	1,324,442	1,242,973	1,113	9,830,935	585,832	1,020,068	1,623,540
DIF_cpamma	1,001,798	1,169,673	853	9,264,063	315,546	658,889	1,265,200
DIF_maninc	225,087	195,372	3	1,533,038	86,827	177,200	306,354
DIF_incass	194,774	134,018	208	841,311	96,107	168,743	271,307
HC	15.566	0.686	12.75	16.75	15.25	15.733	16
LICENSE	0.142	0.071	0.027	0.846	0.1	0.129	0.167
MKS	0.621	2.846	0	26.244	0.033	0.064	0.161
DIV	0.297	0.132	0	0.657	0.212	0.317	0.387
CPE	9.380	4.473	0	17.715	8.825	10.783	12.004

This table shows the descriptive statistics for variables used in regression model. PERFORM is equal to operating performance of audit firms. DIF_cpaal1 is the mean salary difference between certificate accountants and other employees. DIF_cpaman is the mean salary difference between certificate accountants and officers. DIF_maninc is the mean salary difference between officers and assistant officers. DIF_incass is the mean salary difference between assistant officers and assistants. HC stands for the educational levels of employees. LICENSE is the percentage of employees with an accounting certification. DIV is the degree of business diversification. MKS represents the audit firm size. CPE is the natural logarithm of the training expenditure of audit firms. PERFORM, DIF_cpaall, DIF_cpamma, DIF_maninc, and DIF_incass are expressed in new Taiwan dollars

Correlation Matrix

Table 2 displays the correlation coefficients between dependent and independent variables used in regression models. The correlation coefficients for the independent variables, the mean salary difference between certificate accountants and other employees (*DIF_cpaall*) and the mean salary difference between certificate accountants and officers (*DIF_cpaman*), are over 0.7. Furthermore, the correlation coefficients for the mean salary difference between certificate accountants and other employees (*DIF_cpaall*) and the mean salary difference between certificate accountants and officers (*DIF_cpaman*) are higher than 0.9. The correlation coefficients for other variables are all below 0.7. However, the variance inflation factors (VIFs) are less than 10 (un-tabulated), implying that no serious multi-collinearity exists among the independent variables.

Table 2: Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10
1.PERFORM	1	0.975	0.903	0.454	0.313	0.210	-0.096	0.434	0.165	0.274
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.020)	(0.000)	(0.000)	(0.000)
2.DIF_cpaall	0.993	1	0.946	0.409	0.288	0.225	0.054	0.648	0.143	0.259
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.191)	(0.000)	(0.001)	(0.000)
3.DIF_cpamma	0.976	0.988	1	0.189	0.127	0.212	0.066	0.622	0.141	0.219
	(0.000)	(0.000)		(0.000)	(0.002)	(0.000)	(0.113)	(0.000)	(0.001)	(0.000)
4. DIF_maninc	0.496	0.463	0.346	1	0.267	0.161	0.032	0.453	0.083	0.291
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.437)	(0.000)	(0.043)	(0.000)
5.DIF_incass	0.296	0.271	0.186	0.233	1	0.100	-0.040	0.238	-0.001	0.213
	(0.000)	(0.000)	(0.000)	(0.000)		(0.016)	(0.333)	(0.000)	(0.990)	(0.000)
6.HC	0.242	0.184	0.170	0.126	0.082	1	0.147	0.355	0.068	0.224
	(0.000)	(0.000)	(0.000)	(0.002)	(0.048)		(0.000)	(0.000)	(0.098)	(0.000)
7.LICENSE	0.070	-0.155	-0.138	0.000	0.020	0.109	1	-0.101	0.035	0.062
	(0.089)	(0.000)	(0.001)	(0.995)	(0.622)	(0.008)		(0.014)	(0.394)	(0.131)
8.MKS	0.659	0.363	0.253	0.417	0.337	0.244	0.082	1	0.155	0.591
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.046)		(0.000)	(0.000)
9.DIV	0.159	0.139	0.127	0.069	0.017	0.088	0.071	0.083	1	0.047
	(0.000)	(0.001)	(0.002)	(0.094)	(0.689)	(0.033)	(0.085)	(0.044)		(0.253)
10.CPE	0.277	0.256	0.195	0.291	0.241	0.231	0.019	0.316	0.001	1
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.654)	(0.000)	(0.984)	

Table 2 displays the correlation for variables used in regression model. Pearson (Spearman) correlation coefficients are on the upper (lower) diagonal. The number of total observations is 587. Variables are defined in Table 1.

Regression Results

This study investigates the relationship between the salary gap of the hierarchies and the operating performance in audit firms. The empirical results of the hierarchical regression analysis are displayed in Panel A of Table 3. The independent variables of model (1-1) only shows 5 control variables. Different research variables for this study are added to Models (1-2) - (1-5). The adjusted coefficient of determination (Adjusted-R^2) for regression models are 0.451, 0.908, 0.960, 0.982 and 0.990 with F-statistic of 97.140, 346.472, 357.455, 464.100 and 623.688. All F-statistics are statistically significant at the 1 percent level, which indicates that our research variables explain dependent variable with both econometric and economic implications.

Model (1-2) illustrates that the coefficient for the mean salary differences between certificate accountants and other employees (*DIF_cpaall)* is significantly positive (t = 158.277，p＜0.01). A broad salary gap between certificate accountants and other employees indicates that the operating performance of an audit firm is higher. H1 receives a support. When the research variable represents the mean salary difference between certificate accountants and officers (*DIF_cpaman*), model (1-3) demonstrates that the coefficient of that variable is statistically positive (t = 86.256，p＜0.01). The salary gap between certificate accountants and officers is positively associated with the operating performance of audit firms and H2 receives a support. Model (1-4) simultaneously reports the mean salary difference between certificate accountants and officers (*DIF_cpaman*) and the mean salary difference between officers and assistant officers (*DIF_maninc*). The coefficients for these two variables are significantly positive (t = 126.736 and 26.913，p＜0.01). A broad mean salary difference between officers and assistant officers indicates that the operating performance of an audit firm is high. Therefore, H3 receives a support. Model (1-5) shows that The coefficient for the mean salary difference between assistant officers and assistants (*DIF_incass*) is also significantly positive (t = 20.034，p＜0.01). The salary gap between assistant officers and assistants positively relates to the operating performance in audit firms. H4 receives a support.

The empirical results of Panel A demonstrate that a larger salary differences between certificate accountants and officers promote the operating performance in audit firms. Previous studies suggest that the salary differences increase with higher hierarchies. Employees can obtain promotion opportunities by continuously competing with coworkers, which is similar to sequential elimination tournaments. To motivate excellent employees to maintain contributions and compete continuously, salary increases with higher hierarchies. Employees will work hard and continue to compete until the final tournament in order to obtain higher compensation. The salary gap is widest between the second highest hierarchy and the highest hierarchy. The competition at this level is the most aggressive (Rosen, 1986). In order to prove this proposition, the Wald test was used to examine the research variables of models (1-4) and (1-5). The empirical results are shown in Panel B of Table 3.

In model (1-4), the coefficient (α_1) for the mean salary difference between certificate accountants and officers (*DIF_cpaman*) is statistically higher than the coefficient (α_2) for the mean salary difference between officers and assistant officers (*DIF_maninc)* (F=6.74，p<0.01). In model (1-5), the coefficient (α_1) for the mean salary difference between certificate accountants and officers (*DIF_cpaman*) is significantly higher than the coefficient (α_2) for the mean salary difference between officers and assistant officers (*DIF_maninc)* (F=2.82，p<0.01). The coefficient (α_2) for the mean salary difference between officers and assistant officers (*DIF_maninc)* is statistically higher than the coefficient (α_3) for the mean salary difference between assistant officers and assistants (*DIF_incass)* (F=10.80，p<0.01).

Table 3: Regression Result for Relationship between Mean Salary Difference in Hierarchies of Audit Firms and Operating Performance

Panel A: Regression Result

Independent variables	Predicted sign	Model (1-1)	Model (1-2)	Model (1-3)	Model (1-4)	Model (1-5)
Research variables						
DIF_cpaall	+		0.970 (158.277)***			
DIF_cpaman	+			0.916 (86.256)***	0.901 (126.736)***	0.897 (163.955)***
DIF_maninc	+				0.170 (26.913)***	0.158 (32.391)***
DIF_incass	+					0.089 (20.034)***
Control variables						
HC	+	0.068 (2.094)**	0.012 (2.412)**	0.018 (2.020)**	0.014 (2.443)***	0.0123 (2.759)
LICENSE	+	0.004 (0.129)	0.013 (2.886)***	0.000 (0.028)	0.002 (0.342)***	0.007 (1.681)**
MKS	+	0.613 (18.581)***	0.020 (3.214)***	0.067 (6.186)***	0.010 (1.306)	-0.000 (-0.028)
DIV	+	0.101 (3.279)***	0.016 (3.455)***	0.022 (2.605)***	0.015 (2.647)***	0.017 (3.961)***
CPE	+	0.067 (2.057)**	0.016 (3.200)***	0.050 (5.678)***	0.023 (3.847)***	0.012 (2.547)***
Adjusted R^2		0.451	0.908	0.960	0.982	0.990
F-statistic		97.140***	346.472***	357.455***	464.100***	623.688***

Panel B: Coefficients of Wald Test

Wald Test	Difference of sign	Model (1-4) Standardized Coefficient (F-statistics)	Model (1-5) Standardized Coefficient (F-statistics)
$\alpha_1-\alpha_2=0$	+	0.731 (6.74)***	0.739 (2.82)***
$\alpha_2-\alpha_3=0$	+		0.069 (10.80)***
$\alpha_1-\alpha_3=0$	+		0.808 (9.35)***

$$PERFORM = \alpha_0 + \alpha_1 HC + \alpha_2 LICENSE + \alpha_3 MKS + \alpha_4 DIV + \alpha_5 CPE + \varepsilon \qquad (1\text{-}1)$$

$$PERFORM = \alpha_0 + \alpha_1 DIF\_cpaall + \alpha_2 HC + \alpha_3 LICENSE + \alpha_4 MKS + \alpha_5 DIV + \alpha_6 CPE + \varepsilon \qquad (1\text{-}2)$$

$$PERFORM = \alpha_0 + \alpha_1 DIF\_cpaman + \alpha_2 HC + \alpha_3 LICENSE + \alpha_4 MKS + \alpha_5 DIV + \alpha_6 CPE + \varepsilon \qquad (1\text{-}3)$$

$$PERFORM = \alpha_0 + \alpha_1 DIF\_cpaman + \alpha_2 DIF\_maninc + \alpha_3 HC + \alpha_4 LICENSE + \alpha_5 MKS + \alpha_6 DIV + \alpha_7 CPE + \varepsilon \qquad (1\text{-}4)$$

$$PERFORM = \alpha_0 + \alpha_1 DIF\_cpaman + \alpha_2 DIF\_maninc + \alpha_3 DIF\_incass + \alpha_4 HC + \alpha_5 LICENSE + \alpha_6 MKS + \alpha_7 DIV + \alpha_8 CPE + \varepsilon \qquad (1\text{-}5)$$

Panel A of this table shows the OLS regression results of salary gap in different hierarchies and the operating performance in audit firms. The empirical results of Model (1-2) demonstrate that a broad salary difference between certificate accountants and other employees promotes the operating performance of an audit firm. The empirical results of Model (1-3) indicate that a broad salary difference between certificate accountants and officers promotes the operating performance in audit firms. The empirical results of Model (1-4) represent that a broad salary difference between officers and assistant officers promotes the operating performance in audit firms. The empirical results of Model (1-5) demonstrate that a broad salary difference between assistant officers and assistants promotes the operating performance in audit firms. Panel (B) shows the empirical results of Wald Test. It indicates that the association between operating performance and salary gap between certificate accountants and officers is the greatest. *, **, *** Denote one-tailed significance at the 10 %, 5 % and 1 % levels. The number of total observations is 587. Variables are defined in Table 1.

Furthermore, the coefficient (α_1) for the mean salary difference between certificate accountants and officers (*DIF_cpaman*) is also statistically higher than the coefficient (α_3) for the mean salary difference between assistant officers and assistants (*DIF_incass)* (F=9.35，p<0.01). The empirical results of Table 3 demonstrate that the coefficients for the relationship between the operating performance and the mean

salary difference between certificate accountants and officers (*DIF_cpaman*) is significantly greater than the association between the mean salary difference between officers (*DIF_maninc)* and assistant officers and between assistant officers and assistants (*DIF_incass)*. Furthermore, the coefficient for the association between the operating performance and the mean salary difference between officers and assistant officers (*DIF_maninc)* is greater than the association between the operating performance and the mean salary difference of assistant officers and assistants (*DIF_incass)*. In this study, the empirical results are consistent with the tournament theory. The mean salary gap is widest between the second highest hierarchy and the highest hierarchy. The salary differences are also statistically associated with the operating performance in audit firms.

DISCUSSION AND CONCLUSION

This study explores the relationship between the salary gap in different hierarchies and the operating performance in audit firms . The regression results show that the salary differences in different hierarchies are statistically and positively related to the operating performance. The parameter estimates with a multivariate Wald test demonstrate that the association between the operating performance and the salary difference between certificate accountants and other employees is greater than the relationship between the operating performance and the salary difference between officers and assistant officers and between assistant officers and assistants. Consequently, the association between the operating performance and the salary difference between certificate accountants and officers is the highest.

The empirical results are consistent with the tournament theory. The salary gap increases as the hierarchies in firms rise. Employees obtain promotion opportunities by continuously competing with coworkers. Employees can then positively affect the operating performance in firms. A wider salary difference between the hierarchies of audit firms indicates a higher operating performance. Therefore, audit firms can expand salary differences in hierarchies to increase operating performance by designing a salary system. These new assistants must work at least two years before being eligible for promotion. Audit firms also need a certain percentage of officers and assistant officers with work experience to train new employees. Audit firms usually have employment contracts with new assistants. These new assistants must pay a penalty for a breach of contract if they leave the position prior to two years of employment in audit firms. Therefore, the salary for new employees in audit firms is usually low. Due to the nature of the accounting industry, these assistants only make a small contribution to the operating performance in audit firms. However, audit firms can expand salary gap in different hierarchies to improve their productivity, and thereby enhance their operating performance. Thus, the empirical results of this study are practical and consistent with the current accounting industry.

Due to data availability, this study employs a cross-sectional data, which may suffer violations of the assumption of independent observations under the OLS regression model. Additionally, the turnover rate of employees in audit firm is unlikely to measure. These factors comprise a limitation in this study. Future studies may extend this study and investigate the formal and informal organizations in audit firms, the segregation of duties in management classes and centralization and separation of powers.

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