

LAGGED EFFECTS OF TRAINING ON FINANCIAL PERFORMANCE: EVIDENCE FROM LONGITUDINAL DATA

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ABSTRACT

This paper examines the lagged association between training and financial performance of audit firms. Based on a panel data of 136 audit firms in Taiwan from 1992 to 1998, this paper constructs a year fixed effect regression model to test our hypotheses. Both partners' and assistants' training have significantly positive effects on financial performance with the former occurring in the current and one-year-lagged periods and the latter occurring in the one-year-lagged and two-year-lagged periods. Positive and significant association between training and financial performance informs practitioners that training contributes to audit firms and justifies the continuous education requirement in the public accounting profession. The evidence of one-year-delay effect of assistants' training on performance conveys managerial implication to the practitioners in their employee recruitment policy. This paper is the first to exclusively examine the lagged association between training and financial performance at the organization level. The evidence of lagged association explains in part the mixed results on the relation between training and financial performance reported by prior studies. The two-year association between training and financial performance fills the literature gap left by researches on training both in the public accounting and in other industries.

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KEYWORDS: training, financial performance, lagged association, audit firms

INTRODUCTION

Professional training is a compulsory requirement in the auditing industry to advance the expertise and competency of auditors and audit quality. All professional staffs, including partners and assistants, are required to participate continuing professional education (CPE) and take some minimum CPE hours in a specified period. In practice, partners always take the CPE curriculums first and then pass the new knowledge on to assistants through internal training programs. Assistants apply the knowledge gained directly to audit engagements. From the initial training of partners to the final application of assistants to field works takes time. Does training matter? Prior studies indicate that the association between training and financial performance is mixed (Tharenou et al, 2007). We argue that lagged association exists between training and performance and the degree of association varies for different training participants. Few prior studies directly examine the lagged association between training and financial performance, which motivates us to investigate it with the results to fill the gap left.

Panel data of 136 audit firms are constructed from 1992 to 1998 and our focusing the research on specific industry adds research homogeneity (Fasci and Valdez, 1998). This study defines professional training as training hours taken by partners and by assistants. At a given time, training hours of partners and assistants have significantly positive effects on financial performance with the former occurring in the current and one-year-lagged periods and the latter occurring in the one-year-lagged and two-year-lagged periods. The effects of partners' and assistants' training on performance cease in the two-year-lagged and three-year-lagged periods, respectively. Namely, the financial performance effect of training lasts two years and the effect of partners' training occurs immediately but that of assistant's delays one year. Next, the degree of the effects of partners' training on performance is higher than that of assistants' in the current period but lower in the two-year-lagged period.

Prior studies most closely related to this study are d’Arcimoles (1997) and Chen et al. (2008). The former examines the correlation between human resource policies (including training) and company performance, and the latter investigates the association between CPE and financial performance of audit firms. d’Arcimoles (1997) defined training as rate of training expenses and reports an immediate and permanent correlation between training and performance. Using a cross-sectional data set of audit firms in Taiwan, Chen et al. (2008) assessed training by CPE hours taken by partners and assistants but have mixed results regarding the association between CPA and performance. This study is an extension of d’Arcimoles (1997) by dividing training participants into partners and assistants, and measures training by training hours which is a more complete or perfect depiction of training results compared to training expenses (Atkinson et al, 2007). Our evidence that differences exist in the periods of financial performance effects of training taken by partners and by assistants naturally extends d’Arcimoles (1997). However, our finding that the impact of training on financial performance lasts two years is different from d’Arcimoles (1997). Although Chen et al. (2008) and this study use the same data set, they employ a cross-sectional observations but we utilize panel data. Hence, this study has data refinement over them and our results of lagged relation between training and financial performance explain their mixed results.

To the best of our knowledge, this paper is the first to exclusively examine the lagged relation between training and financial performance at an organization level. The evidence of lagged association explains in part the mixed results identified in prior studies, which contributes to the literature of human resources management. Additionally, our results provide managerial implications for the public accounting practitioners. First and foremost, the evidence of one-year-delay financial performance effects of assistants’ training signals managerial implication to the employee recruitment policy of audit firms. It is advisable for the practitioners to lower the turnover of assistants, especially those of entry level assistants, to retain the experienced employees and in turn to accumulate human capital for the firms. Next, positive association between training and financial performance informs practitioners that CPE contributes to audit firms. Further, the two-year but not permanent significant financial performance effects of training justifies the continuous education requirement in the auditing industry. That is, training has positive effect on financial performance for two running years only. To keep auditors proficient with the new accounting and auditing standards and to make auditors knowledgeable about new information and communication technology, auditors’ taking continuous professional training is warranted.

The remainder of this paper proceeds as follows. This paper reviews prior literature and develops hypotheses in Section 2. Section 3 describes the methodology and Section 4 presents empirical results. Practical implication discussions are appeared in Section 5. This paper concludes in Section 6.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

By definition, training is the systematic acquisition and development of knowledge, skill, and attitudes required by employees to adequately perform a task or job or to improve performance in the job environment (Goldstein, 1980; Latham, 1988). Prior studies document that training is positively related to both human resource outcomes (such as low absenteeism, low turnover, and motivation) and organizational performance (such as output or quality). However, the relationship between training and financial performance is mixed (Tharenou et al, 2007). Some researchers find positive results (e.g., Aragón-Sánchez et al, 2003; García, 2005; Guerrero and Barraud-Didier, 2004) but some have negative findings (e.g., Paul and Anantharaman, 2003). One of the reasons behind the mixed results is the lagged effects of training on financial performance. The effects of training on organizational performance actually have an average maturing period which exceeds the financial year (García, 2005).

In this line of studies on professional training of audit firms, low levels of technical training associate with deficient practice (Wallace and Campbell, 1988) but high level of continuing education relates to increased knowledge, a necessary component of competence demand (Grotelueschen, 1990). Substandard professional performance related to competency is typically accompanied by relatively low levels of technical professional training (Thomas et al, 1998). When professionals or experts receive more formal instructions through either academic education or professional training courses of audit firms, they have

better audit performance (Bonner and Pennington, 1991).

Milgrom and Roberts (1992) stated that the most important specialized input in partnerships is typically the knowledge and abilities of the workers, that is, their human capital. Investment in education and training expedites the formation of human capital and then improves the productivity of employees (Psacharopoulos, 1985). From the perspective of human capital theory, education and training are regarded as a critical path to invest human capital. Educational training thus is a supporting system to enhance human capital, especially the firm-specific human capital. Audit firms are a professional service organization and their human capital is embodied in the auditors with expertise and competency. By virtue of pre-employment formal academic education, continuing professional education, and work experience, auditors are qualified to perform audit (Boynton et al, 2001). Much of an organization's knowledge resides in its human capital (Lepak and Snell, 1999) and human capital is fostered by the knowledge and skill gained from education and training (Schultz, 1961). Hence, audit firms communicate related knowledge and professional skills to employees through educational training in the following situations: when employees are newly recruited or promoted, or when accounting/auditing standards or related laws/rules are promulgated or amended. This makes the employee possess necessary competence to fulfill audit job and to perform it efficiently and effectively.

Practically, professional training of audit firms can be administered internally or externally. Public accounting association of each country is always responsible for most of the external CPE programs and for the registration of internal and external CPE hours taken by auditors. For example, auditors are required to have 120 CPE hours in every 3-year period in some states of the U.S. (Arens et al, 2003). The Financial Supervisory Commission in Taiwan requires auditors serving public companies to have 100 CPE hours in every 3-year period and have minimum 24 CPE hours in each year. External training curriculums contain general courses for all auditors in the industry. The external training curriculums include courses such as auditing and financial accounting standards and financial attestation practices, tax rules and tax attestation practices, enterprise resource planning (ERP), new information technology of eXtensible Business Reporting Language (XBRL), or inheritance tax planning. Internal training courses are designed to cater to the needs of individual audit firms. Most internal curriculums are arranged for audit engagements with specific topics such as internal control assessment, introductory of computer auditing, audit planning and supervision, detection of management fraud, and analytical review procedure.

In practice, partners always take part in external training curriculums first and then pass the knowledge gained on to the assistants through internal training programs. Take the internal training programs of a big international audit firm, Ernst & Young, as an example. To introduce a new audit software being used within its global member firms, the headquarter office of Ernst & Young in London first trains seeds instructors from area offices. Then, area seeds instructors hold a training program for seeds instructors from local offices. Finally, local seeds instructors take charge of training their firms' employees. In the training program, partners are always the seeds instructors. Apparently, time lag exists between the professional training taken by partners and by assistants.

In audit firms, partners play dual role as chief executive officers and owners. Partners thus have more incentives to advance the growth and performance of the audit firms than do assistants (Pennings et al, 1998). The average years of experience for partners, managers, senior or in-charge auditors, and staff assistants are over 10 years, 5-10 years, 2-5 years and 0-2 years, respectively (Elder et al, 2008). Partners are much experienced and the human capital embedded in partners constitutes the critical resources that are valuable, rare, unique, and difficult to imitate. Equipped with more experience and expertise, partners absorb knowledge from professional training and apply it to audit tasks immediately. In contrast, it takes time for assistants to be proficient at applying knowledge gained from professional training.

Based on prior studies and the practical phenomenon observed, this paper expects that training of partners affects financial performance in both current and future periods but training of assistants affects future period only. This study establishes the following hypotheses to articulate the expectations.

Hypothesis 1: Professional training taken by partners has both immediate and lagged association with financial performance of audit firms.

Hypothesis 2: Professional training taken by assistants only has lagged association with financial performance of audit firms.

METHODOLOGY

Empirical panel data used in this paper are registered audit firms in the Taiwanese auditing industry. Based on the Structure-Conduct-Performance theoretical framework developed by Cowling and Waterson (1976), we establish the following year fixed effects regression equation to test our hypotheses due to a panel of four years data is used (Greene, 1997).

$$PERF_{t+\tau} = \beta_0 + \beta_1 PARTTRAIN_t + \beta_2 ASSITRAIN_t + \beta_3 SIZE_{t+\tau} + \beta_4 DIV_{t+\tau} + \beta_5 GDP_{t+\tau} + \beta_6 YEAR_t + \varepsilon_{t+\tau}$$

where,

t = 1992, 1993, 1994, and 1995;

τ = number of lagged period, 0, 1, 2, and 3;

$PERF$ = financial performance;

$PARTTRAIN$ = training taken by partners;

$ASSITRAIN$ = training taken by assistants;

$SIZE$ = size of audit firms;

DIV = degree of business diversification;

GDP = economic indicator;

$YEAR$ = dummy variable coded 1 for observations in year t , and 0 otherwise

ε = error term.

Accounting defines financial performance as total revenues minus total expenses, that is, net income or net profit. Partners are the owners and residual interest claimants of audit firms and their annual income comprises salaries received and shares of operating profit. The salaries of partners, weekly or monthly, are part of the total expenses of the firms. According to related laws and regulations, operating profit of audit firms should be allocated to partners annually and is not allowed to be kept as retained earnings. The more salaries paid to the partners, the less the operating profit of the audit firms. It is indifferent for the partners to receive salaries or not in terms of their comprehensive annual income. In addition, the criteria for salary payment to partners differ across firms. The salary expenses of partners are thus added back to financial performance to reduce the artificial noise caused by partners' salaries. As a result, this study defines financial performance ($PERF$) of audit firms as an organizational level outcome, total revenues minus total expenses plus partner salaries then deflated by the ending number of partners.

Measures of training commonly used in prior studies include training expenses and training hours. Training hours are leading indicator of training expenses in the measurement of economic outcome of training (Atkinson et al, 2007). From the perspective of managerial accounting, training hours are more complete or perfect depictions of training results compared to training expenses. Further, global public accounting professions employ the total-training-hour approach for both partners and assistants. To provide a refined measurement of training, this study defines professional training as mean training hours taken by partners ($PARTTRAIN$) and by assistants ($ASSITRAIN$).

Apart from the variables of interest, some other factors affecting financial performance of audit firms are incorporated into the empirical model as control variables. In theory, audit firms can enjoy economy of scale when their size expands (Watts and Zimmerman, 1986). Audit firm size can be estimated by either the number of full-time employees (Collins-Dodd et al, 2004) or market share of the individual firms (Chen et al, 2002; Chen et al, 2008). Prior studies report a positive relationship between audit firm size and performance (Collins-Dodd et al, 2004; Chen et al, 2002; Chen et al, 2008). Based on prior studies,

this study expects a positive association between financial performance and size of audit firms (*SIZE*), defined as nature logarithm of the total number of employees in the firms.

To meet the growing need for non-audit services, audit firms have expanded their scope of services to provide non-audit services, such as tax services, management consultation services as well as accounting and bookkeeping services (Elder et al, 2008, p.12). Owing to economies of scope arising from the sharing or joint utilization of inputs, diversities in service line enhance a firm's efficiencies (Baumol et al, 1982, p.75-79). We measure the degree of business diversification (*DIV*) by the following Entropy index.

$$DIV = \sum_{i=1}^{10} S_i \text{LOG} \left(\frac{1}{S_i} \right)$$

where S_i denotes revenues from practice i as a percentage of total revenues in an audit firm. According to the data set used by this paper, audit firms may offer ten practices, including audit of financial statements of public companies, audit of financial statements of private companies, audit of financial statements for granting a bank loan, audit of financial statements for special purposes, audit of corporate income tax returns, tax planning and consultation, tax appeal and tax litigations, other tax operations, management advisory services, registration filing and bookkeeping services. In theory, the larger amount the Entropy index, the greater the degree of diversification. Based on prior studies (Rumelt, 1974; Khanna and Palepu, 1997; Singh et al, 2001), this study expects a positive relationship between degree of business diversification and financial performance.

As a professional service organization, audit firms are affected by local economy (e.g., Reynolds and Francis, 2001). Economic indicator (*GDP*), defined as Taiwanese Gross Domestic Product, is included to control the effects of external environment on performance. However, auditors have provided services to the same clients for years (Chang and Lin, 2000) and most of their practices are statutory. This makes the effects of environment factors on financial performance of audit firms to be limited. As a result, this study does not specify any directional prediction on the relationship between economic indicator and financial performance.

RESULTS

Empirical panel data of 136 audit firms are obtained from the 1992-1998 Survey Report of Audit Firms in Taiwan, published by the Financial Supervisory Commission (FSC). To collect business information on the auditing industry for macro-economic analyses and industrial policy formations, the Taiwanese Ministry of Finance had annually administered the survey over all registered audit firms from 1989 to 2003. Hence, the empirical data of this study are annual observations. The FSC took charge of the official survey in 2004. Both agencies publish the Survey Report annually except in 1991. Items surveyed include quantitative information of total revenues and their compositions, total expenditures and their compositions, demographics of various levels of employees, ending amount of fixed assets. Qualitative information is collected by an open questionnaire asking about operating difficulties encountered and future business strategy to be taken. As the survey is administered pursuant to the Act of Statistics, audit firms surveyed are obligated to fill the questionnaire correctly and in due time period. Thus annual response rate, according to the Survey Report, is over eighty percent.

In the Survey Report, data about professional training include training expenses and training hours. Although information of training expenses is provided annually, it is an aggregate amount for the audit firms. Information of training hours includes annual training hours taken by partners and by assistants, but is available from 1992 to 1995 only. To investigate the lagged association between training hours and financial performance, this paper constructs a panel data of 136 audit firms for the sample period. As the periods of lagged association investigated are three, our sample period covers from 1992 to 1998. To account for inflation, we deflate all monetary variables by the yearly consumer price index. The number of observation for current, one-year-lagged, two-year-lagged, and three-year-lagged periods is 544

firm-years (136 firms*4 years). Specifically, experimental variables of professional training taken by partners and assistants include 136 audit firms from 1992 to 1995 and dependent and control variables are provided for current period (1992-1995), one-year-lagged period (1993-1996), two-year-lagged period (1994-1997), and three-year-lagged period (1995-1998).

Descriptive Statistics and Correlation Analysis

Descriptive statistics of variables for current, one-year-lagged, two-year-lagged, and three-year-lagged periods are displayed in Panels A, B, C, and D of Table 1. As shown in Panel A, mean training hours taken by partners (*PARTTRAIN*), 48.149, are higher than mean training hours taken by assistants (*ASSITRAIN*), 30.595. Mean financial performance (*PERF*) ranges from 1,521,602 (current period) to 1,610,322 (two-year-lagged period). Average size of audit firms (*SIZE*) lies between 2.756(three-year-lagged period) and 2.798(one-year-lagged period), indicating that total number of employee in audit firms is about eight to ten. All of the amounts of degrees of business diversification (*DIV*) are about and above 1 in either period.

Table 1: Descriptive Statistics

	Mean	S.D.	Min.	Q1	Median	Q3	Max.
Panel A: Current Period (n=544)							
<i>PARTHOUR</i>	48.149	43.371	1.500	22.000	38.000	60.375	450.000
<i>ASSIHOUR</i>	30.595	30.014	1.071	8.643	22.269	40.000	215.667
<i>PERF</i>	1,521,602	1,307,277	-670,309	631,252	1,154,618	2,017,443	7,451,213
<i>SIZE</i>	2.786	1.024	0.693	2.197	2.639	3.258	6.581
<i>DIV</i>	1.107	0.351	0.174	0.852	1.129	1.379	1.972
<i>GDP</i>	6,394,819	655,044	5,502,802	6,094,146	6,673,939	7,252,757	7,252,757
Panel B: One-year-lagged Period (n=544)							
<i>PERF</i>	1,575,710	1,334,485	-670,309	656,056	1,219,408	2,115,922	7,114,911
<i>SIZE</i>	2.798	1.041	0.693	2.197	2.565	3.277	6.686
<i>DIV</i>	1.091	0.351	0.000	0.857	1.081	1.360	1.911
<i>GDP</i>	7,020,257	692,779	6,094,146	6,673,939	7,252,757	7,944,595	7,944,595
Panel C: Two-year-lagged Period (n=544)							
<i>PERF</i>	1,610,322	1,497,432	-830,166	635,088	1,195,145	2,123,632	11,106,571
<i>SIZE</i>	2.772	1.071	0.693	2.079	2.565	3.219	6.782
<i>DIV</i>	1.086	0.349	0.081	0.853	1.076	1.339	2.011
<i>GDP</i>	7,652,025	729,216	6,673,939	7,252,757	7,944,595	8,610,139	8,610,139
Panel D: Three-year-lagged Period (n=544)							
<i>PERF</i>	1,599,332	1,571,286	-830,166	576,918	1,192,095	2,048,463	11,106,571
<i>SIZE</i>	2.756	1.105	0.693	2.079	2.485	3.219	6.879
<i>DIV</i>	1.080	0.356	0.000	0.840	1.062	1.338	2.045
<i>GDP</i>	8,279,264	741,225	7,252,757	7,944,595	8,610,139	9,238,472	9,238,472

This table shows the information about descriptive statistics of variables in the empirical model with Panel A for current period observations. Panels B, C and D display descriptive statistics for observations in the one-year-lagged, two-year-lagged and three-year-lagged periods, respectively. PERF is expressed in NT dollars but GDP in million NT dollars. Number of observations is 544 in each panel. Variable definitions are as follows: PARTTRAIN=training taken by partners; ASSITRAIN= training taken by assistants; PERF=financial performance; SIZE=size of audit firms; DIV=degree of business diversification; GDP= economic indicator.

Table 2 lists the correlation coefficient matrix for both dependent and independent variables. All independent variables except economic indicator (GDP) are significantly correlated with dependent variable financial performance (PERF) for all periods either in Pearson or Spearman coefficients. Mean training hours taken by partners (PARTTRAIN) significantly correlates with that of assistants (ASSITRAIN). Further, some other independent variables also significantly correlate with each other. However, the correlation coefficients are less than 0.5, implying no serious multi-collinearity exists among the independent variables.

Table 2: Correlations Matrix

	<i>PERF</i>	<i>PARTHOUR</i>	<i>ASSIHOURL</i>	<i>SIZE</i>	<i>DIV</i>	<i>GDP</i>
Panel A: Current Period (n=544)						
<i>PERF</i>		0.141***	0.214***	0.558***	0.428***	0.031
<i>PARTHOUR</i>	0.259***		0.449***	-0.006	0.030	0.089**
<i>ASSIHOURL</i>	0.159***	0.432***		0.154***	0.141***	-0.003
<i>SIZE</i>	0.424***	0.012	0.096**		0.401***	0.018
<i>DIV</i>	0.407***	0.091**	0.137***	0.312***		-0.053
<i>GDP</i>	0.032	0.120***	0.006	0.015	-0.047	
Panel B: One-year-lagged Period (n=544)						
<i>PERF</i>		0.144***	0.245***	0.560***	0.420***	0.024
<i>PARTHOUR</i>	0.270***		0.456***	-0.019	0.042	0.091**
<i>ASSIHOURL</i>	0.196***	0.426***		0.178***	0.156***	-0.008
<i>SIZE</i>	0.441***	-0.007	0.114***		0.416***	-0.024
<i>DIV</i>	0.376***	0.107**	0.140***	0.311***		-0.057
<i>GDP</i>	0.006	0.122***	0.001	-0.048	-0.053	
Panel C: Two-year-lagged Period (n=544)						
<i>PERF</i>		0.095***	0.237***	0.596***	0.439***	0.013
<i>PARTHOUR</i>	0.224***		0.460***	-0.030	0.051	0.081*
<i>ASSIHOURL</i>	0.178***	0.426***		0.193***	0.174***	-0.002
<i>SIZE</i>	0.460***	-0.012	0.118***		0.425***	-0.031
<i>MKS</i>	0.704***	0.070	0.176***	0.880***	0.400***	0.004
<i>DIV</i>	0.371***	0.121***	0.164***	0.310***		-0.029
<i>GDP</i>	-0.031	0.107**	0.001	-0.061	-0.030	
Panel D: Three-year-lagged Period (n=544)						
<i>PERF</i>		0.080*	0.227***	0.620***	0.458***	-0.009
<i>PARTHOUR</i>	0.198***		0.453***	-0.032	0.007	0.092**
<i>ASSIHOURL</i>	0.173***	0.429***		0.185***	0.182***	0.007
<i>SIZE</i>	0.480***	-0.012	0.117***		0.438***	-0.001
<i>DIV</i>	0.377***	0.068	0.178***	0.331***		0.000
<i>GDP</i>	-0.045	0.125***	0.013	-0.025	-0.009	

Panels A, B, C and D of this table display the correlation matrices for current period, one-year-lagged, two-year-lagged and three-year-lagged periods observations, respectively. *, **, *** Denote two-tailed significance at the ten percent, five percent, and one percent levels. Number of observations is 544 in each panel. For each panel, Pearson coefficients locate in the upper triangle and Spearman coefficients in the lower triangle. Variables are defined in Table 1.

Regression Results

The year fixed effects regression results are presented in Table 3. The explanatory power of models, adjusted R^2 , lies between 0.413 and 0.499, which implies that our empirical models are well specified. All t-statistics of variable coefficient are calculated using White (1980) robust standard errors to correct for heteroscedasticity. As a check on the multi-collinearity among independent variables, we estimate the variance inflation factors (VIF). In econometrics, VIF greater than 10 implies serious multi-collinearity existing among independent variables. In the regression models of table 3, the variable VIFs are less than 3.418.

Panel A of Table 3 displays the regression results. The current period model, shown in Column (A), indicates a positive coefficient on training taken by partners (*PARTTRAIN*) ($p < 0.01$) but an insignificantly positive coefficient on training taken by assistants (*ASSITRAIN*). Column (B) lists results for the one-year-lagged period. As indicated, both coefficients on training taken by

partners (*PARTTRAIN*) and by assistants (*ASSITRAIN*) are significantly positive ($p < 0.01$ and $p < 0.05$). For the two-year-lagged period appeared in Column (C), coefficient on training taken by partners (*PARTTRAIN*) is positive but insignificant, however coefficient on training taken by assistants (*ASSITRAIN*) is significantly positive ($p < 0.10$). Finally, Column (D) reports the results for three-year-lagged period and shows that both coefficients on training taken by partners (*PARTTRAIN*) and by assistants (*ASSITRAIN*) are positive but insignificant.

In sum, training taken by partners has positive effects on financial performance in the current and one-year-lagged periods. The effects of training taken by assistants on financial performance exist in the one-year and two-year-lagged periods. In other words, there are immediate and lagged associations between training taken by partners and financial performance, which lends a support to the hypothesis 1. There is only lagged association between training taken by assistants and financial performance. Thus, hypothesis 2 is supported as well. In sum, the significant association lasts two years for either professional training taken by partners or by assistants. The financial performance effects of training taken by assistants delay one year but that of training taken by partners occurs immediately.

To examine the differences in degree of performance effects of professional training, this paper performs the Wald test on coefficients of training taken by partners (β_1) and by assistants (β_2). As shown in Panel B of Table 3, the coefficient differences between β_1 and β_2 are positive and significant (F-statistic= 10.225) in the current period. It means that the degree of performance effects of training taken by partners is higher than that of the training taken by assistants. Namely, partners' training contributes more to financial performance than does assistants' training. In the one-year-lagged period, the coefficient differences between β_1 and β_2 are positive but insignificant, implying no difference in the degree of performance effect between training taken by partners and by assistants. However, the coefficient differences between β_1 and β_2 are negative and significant (F-statistic= 5.445) in the two-year-lagged period. It denotes that the degree of performance effect of training taken by partners is less than that of training taken by assistants. Finally, in the three-year-lagged period, the coefficient differences between β_1 and β_2 are negative but insignificant, indicating no significant difference in degree of performance effects of professional training taken by partners and assistants. Taken together, the performance effects of professional training taken by partners differ from that of taken by assistants in different periods, echoing to the results reported in Panel A of Table 3.

With regard to the results of control variables, all variables but economic indicator (*GDP*) are positively associated with financial performance as hypothesized. Moreover, we conduct hierarchical regressions to verify the explanatory power incrementally contributed by our experimental variables in Table 3 (un-tabulated results here). Given the control variables in the regression model, experimental variables, training taken by partners (*PARTTRAIN*) and training taken by assistants (*ASSITRAIN*), additionally explain 43.21%, 43.21%, 43.21%, and 43.21%, variation in dependent variable for Columns (A), (B), (C), and (D). Results above demonstrate that professional training explains financial performance with both econometric and economic implications.

DISCUSSIONS

In this study, the evidence of positive association between training and performance informs practitioners that CPE contributes to audit firm financially. That is, audit firms as a whole are benefited from both partners' and assistants' training. However, there are differences in the period of financial performance effects of training taken by partners and assistants. The former's effects occur in the current and one-year-lagged periods but the latter's effects exist in the one-year-lagged and two-year-lagged periods. During the sampling period, on average, assistants account for 77.4% of employees in audit firms. Practitioners state that turnover of auditors is relatively high and that of entry level assistants is about 30%. Most entry level assistants send in their resignation and leave audit firms at the end of two-year employment contract. As entry level assistants constitute the major manpower of each audit engagement,

audit firms put in more resources on their professional training. Under the organization of employment, the evidence of one-year-delay performance effect of training taken by assistants conveys managerial implication to the practitioners in their employee recruitment policy. If the entry level assistants enter audit firms at the beginning of the current period and leave at the end of one-year-lagged period, the financial performance effects of training taken in the one-year-lagged period vanish. Accordingly, it is advisable for practitioners to lower the turnover of assistants, especially entry level assistants. To retain more experienced employees and in turn accumulate human capital benefit audit firms should deliberately take action to lowering the turnover of assistants.

Table 3: Regression Results of the Association between Training and Performance

Panel A Regression Results				
Variables(Expected Sign)	(A) Current Std. Coef. (t-sta.)	(B) One-year-lagged Std.Coef. (t-sta.)	(C) Two-year-lagged Std. Coef. (t-sta.)	(D) Three-year-lagged Std. Coef. (t-sta.)
<i>Experimental variables</i>				
<i>PARTHOUR(?)</i>	0.108*** (2.918)	0.100*** (2.630)	0.055 (1.505)	0.057 (1.643)
<i>ASSIHOUR(?)</i>	0.049 (1.308)	0.076** (1.979)	0.073* (1.960)	0.058 (1.631)
<i>Control variables</i>				
<i>SIZE(+)</i>	0.265*** (5.601)	0.278*** (5.723)	0.268*** (5.722)	0.273*** (6.096)
<i>DIV(+)</i>	0.208*** (5.744)	0.185*** (4.961)	0.173*** (4.835)	0.182*** (5.280)
<i>GDP(?)</i>	0.029 (0.870)	0.033 (0.997)	0.021 (0.664)	-0.018 (-0.585)
<i>YEAR (?)</i>	(included)	(included)	(included)	(included)
Adjusted-R ²	0.418	0.413	0.463	0.499
F-statistics	65.973***	62.988***	77.198***	90.190***
Number of observation.	544	544	544	544
Panel B Wald Test(Expected Sign)				
$\beta_1 - \beta_2 = 0(+/-)$	0.059*** (10.225)	0.024 (0.019)	-0.018*** (5.445)	-0.001 (0.130)

*PERF_{t+τ} = β₀ + β₁PARTHOUR_t + β₂ ASSIHOUR_t + β₃ SIZE_{t+τ} + β₄ DIV_{t+τ} + β₅ GDP_{t+τ} + ε_{t+τ}. This table lists the regression results of the association between training and performance in Panel A. Panel B reports the Wald Test results for differences in the coefficient between β₁ and β₂. In the Panel A, regression results of current period, one-year-lagged, two-year-lagged and three-year-lagged periods observations are shown in the Columns (A), (B), (C), and (D). *, **, *** Denote two-tailed significance at the ten percent, five percent, and one percent levels, respectively. Number of observations is 544 in each column. Variables are defined in Table 1.*

Using the same data set as this paper, Chen et al. (2008) examined the association between CPE and financial performance of audit firms by cross-sectional pooled data from 1992 to 1995. They establish training hours of partners and assistants for big, medium, and small-sized audit firms. Except the training hours of assistants in big-sized audit firms, the association between CPE and financial performance is either insignificantly positive or negative. Their mixed results may be attributed to the lagged effects of training on financial performance identified by this paper.

From an outsider’s perspective, d’Arcimoles (1997) examined the correlation between human resource policies and company performance using a longitudinal data of 61 large French companies during the period 1982-1989. Because of missing financial data, only 42 companies could be used for testing correlations between social data and the change in economic performance of a firm. Social data include employment, wages, training, and social climate. When efforts devoted to training and performance are considered at a given time, their associations are immediate and permanent. The associations seem to be delayed by 3 or 4 years when change in this effort is taken into consideration.

In contrast, this paper reports that the financial performance effects of partner and assistant training cease in the two-year and three-year-lagged periods, respectively. Namely, the effects of training on financial

performance lasts for two years only. Besides, the association between training of assistants and financial performance delays one year only. In terms of auditing industry, our results sound logical. First, when rendering services to clients, auditors have to keep pace with the progress of economy development. To do this, auditors should be equipped with the rapidly changing information and communication technology. Our two-year effects of training on financial performance seem to be more practical than the permanent effects identified by d'Arcimoles (1997). Second, partners are seasoned employees in audit firms. Accumulated with expertise and experience, partners are more apt at converting knowledge gained from training to field work, resulting in the immediate improvement of financial performance. High turnover rate and lacking much work experience and competency make assistants apply the knowledge from training to audit tasks difficult. This leads to the delayed effects of assistant training on financial performance. Thus, there are differences in the period of financial performance effects of training taken by partners and by assistants, which is a natural extension of d'Arcimoles (1997).

Reviewing the researches on training, Tharenou et al. (2007) concluded that training does not appear to be related to a firm's financial performance. The evidence of lagged association between training and financial performance obtained in this study can be used to disentangle the black box of mixed relation identified by prior studies.

CONCLUSION

In the aftermath of major financial reporting scandals such as Enron and WorldCom, both American PCAOB and the British Financial Reporting Council pay much attention to the quality control of audit firms. In the auditing industry, continuing professional education (CPE) is a mechanism of professional training with which to heighten the expertise and competency of auditors, audit quality, and in turn financial performance. By a panel data of annually selected 136 audit firms, this paper investigates the lagged effects of CPE on financial performance of audit firms in Taiwan.

After controlling other factors affecting financial performance, empirical results indicate that training taken by partners has significantly positive effects on financial performance in the current and one-year-lagged periods, while training taken by assistants has positive effects in the one-year lagged and two-year-lagged periods. That is, financial performance effects of training last two years. Effects of training taken by partners occur immediately but that of training taken by assistants delay one year. Next, the degree of financial performance effects of training taken by partners is higher than that of training taken by assistants in the current period but lower in the two-year-lagged period.

In practice, after acquiring the academic qualifications in accounting, most auditors enter their careers as assistants in audit firms. They continue to learn and gain expertise through learning by doing. Learning by doing, in effect, is another critical type of professional training and is also referred to as on-the-job training. It is an important link in the professional training chain and a determinant of financial performance in audit firms. To examine the association between on-the-job training and performance (either financial or non-financial) is a promising avenue for future study.

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