

SERVICE QUALITY, SIZE, AND PERFORMANCE OF AUDIT FIRMS: CONSIDERATION OF MARKET SEGMENTS AND BUSINESS STRATEGIES

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ABSTRACT

This study investigates the relative importance between service quality and firm size in the performance determinants of audit firms under different market segments and business strategies. This study extracts a human capital-based service quality by the principal component analysis technique. In terms of market segment, total samples are divided into national, regional, and local audit firms. Further, based on the business strategies audit firms take, regional and local firms are classified into two categories: stability and expansion type firms. Empirical results indicate that service quality is a more important performance determinant than firm size in the national firms. However, firm size is more important in the regional and local firms. Next, operating performance of expansion regional firms is better than that of stability regional firms. The extent of performance effects of service quality and firm size differs between audit firms taking varied business strategies.

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KEYWORDS: Service Quality, Firm Size, Performance, Market Segment, Business Strategy

INTRODUCTION

In the aftermath of Enron and other major financial reporting scandals, the US Congress passed the Sarbanes-Oxley Act of 2002. The Act established the Public Company Accounting Oversight Board (PCAOB) to oversee the auditors of public companies. The PCAOB establishes auditing and quality control standards for public company audits, and performs inspections of the quality controls at audit firms performing those audits. Through regular inspections, the PCAOB evaluates the quality of auditing tasks on a specific engagement and reviews the practices of auditors, operating policies, and auditing procedures related to audit quality. In addition, PCAOB inspections focus on the assessment of the professional competency of auditors, the assignment of responsibility, and continuing professional education programs. These inspections are a clear indication that human resource management is an important determinant of service quality in audit firms.

Audit firms are typically a professional service organization, a labour and expertise-intensive industry. To investigate the service quality from inside of audit firms appears warranted. Human capital, especially the auditors' technical competencies, plays a key role in the determination of service quality. The technical competencies refer to auditors' experience, education, professionalism, employment history, and organization structure of audit firms (Deis and Giroux, 1992). Prior studies document the existence of market segmentation in auditing industry (DeFond, Francis and Wong, 2000; Ghosh and Lustgarten, 2006). Audit firms in different market segments are regulated differently. Under the varied regulation environment, audit firms take different responding mechanisms to enhance their operating performance. Prior studies note that both audit quality and audit fees are higher in a stricter legal liability regime (Venkataraman, Weber and Willenborg, 2008). In other words, audit firms in different market segments have different performance determinants. In addition to the service quality, audit firm size is a critical performance

determinant identified by prior studies (Collins-Dodd, Gordon and Smart, 2004; Chen, Chang and Lee, 2008). Whether the performance determinants differ for audit firms in different market segments and under varied legal liability regime? To investigate the relative importance between service quality and firm size in the performance determinants of audit firms frames our first purpose. In order to satisfy diverse demands of customers, audit firms need different professional skill and expertise to provide different services, resulting in varied business strategies taken by audit firms. What are the effects of different business strategies on operating performance? Our next purpose is to investigate the differences in performance and in relative importance between service quality and firm size in the performance determinants for audit firms taking different business strategies.

Empirical data are from the 1995 to 2009 Survey Report of Audit Firms in Taiwan. From the perspective of market segment, total samples are divided into three categories including national, regional and local audit firms. Next, based on the business strategies audit firms take, both regional and local audit firms are further classified into stability and expansion type firms and name them as stability regional firms or expansion local firms etc. Empirical results report that service quality is more important than firm size in the performance determinants of national firms. However, firm size is more important than service quality in both regional and local firms. Next, the extent of performance effects of firm size in the national firms is lower than that of in the regional and local firms. The extent of performance effects of firm size in the local firms is higher than that of in the regional firms. Finally, expansion regional firms are superior in performance to stability regional firms. Stability regional firms possess higher extent of performance effects of service quality than expansion regional firms. In contrast, stability local firms have higher extent of performance effects of firm size than expansion local firms. Equipped with unique dataset not available elsewhere, we are the first to extract audit firm service quality from the perspective of human capital. With findings, this study contributes knowledge to total quality management related literatures and provides managerial implications to the practitioners. The remainder of this study proceeds as follows. Section 2 reviews related literatures and develops the hypotheses. We describe research design in section 3 and report empirical results in section 4. We conclude in section 5.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Around the world, authoritative agencies set varied legal regulations over audit firms in different market segments. For example, under the legal environment in the US, companies register for their IPO pursuant to the Securities Act of 1933. After going public, they file under the Securities Act of 1934. As litigation risk exposure is higher under the 1933 Act than the 1934 Act, auditors should provide higher quality service and receive higher fees for IPO audits (Venkataraman et al., 2008). Practically, large public companies are more complicated in organization structure and have higher internal agency conflicts. These companies engage larger audit firms to audit their financial statements to mitigate agency cost (Simunic and Stein, 1987; Francis, Maydew and Sparks, 1999). In contrast, small and medium-sized private companies are simpler in organization structure and are served by smaller audit firms to seek low-priced audit services. In accordance with Taiwanese Civil Code and Criminal Code, auditors in either large or small audit firms assume the same civil, criminal, and administrative liabilities.

However, the Securities and Exchange Act imposes more civil and criminal liabilities on auditors rendering services to public companies to protect investors. In addition, the Taiwanese Institute of Certified Public Accountant (TICPA) establishes more requirements on auditors serving public companies. For example, auditors must take at least 12-hour continuing professional education annually, 24 hours for two years, and 50 hours for three years running. The required hours double for auditors rendering attestation services to public companies. To safeguard investors, regulations over auditors in public company audit firms are relatively stringent. For example, the Certified Public Accountant Act empowers regulatory agencies to inspect businesses and related affairs of public company audit firms to protect public interests. In contrast, services provided to private companies by smaller audit firms primarily include the compliance of related laws and rules and hence their audit service quality is highly homogeneous. For example, tax laws allow small audit firms to provide accounting and bookkeeping services; preparation of corporate and individual tax returns. Regulation on financial reporting of private companies and their audit firms is relatively loose.

Prior studies relate audit fees with auditor exposure to losses from legal liability. Audit fees are a linear combination of the marginal cost of auditing plus expected losses from litigation (Simunic, 1980). When the expected losses from imposition of legal liability increase, the audit fees increase (Beatty, 1993). Audit firms increase their fees as their insurance exposure increases (Willenborg 1999). Further, both audit quality and audit fees are higher in a stricter legal liability regime (Venkataraman et al., 2008). A number of studies show that the long-term success of a corporation is closely related to its ability to adapt to customer needs and changing preferences (Eklof and Selivanova, 2008). High quality products/services allow companies to avoid profit-damaging competition based on price (Gale and Swire, 1977) and enable the companies to charge premium prices and generate superior margins (Porter, 1980; Klein and Leffler, 1981; Shapiro, 1983). Service quality aims to know customers needs, meet their expectations, and satisfy them by fulfilling their requirements, especially critical requirements (Chen and Kuo, 2011). From the perspective of consumer behavior, service quality perceived by customers has an impact on customer satisfaction which has a positive influence on a customer's loyalty (Wu and Chan, 2011). Customers are becoming increasingly demanding in their search for suppliers who can supply quality products, provide excellent service, and continuously improve their offerings (Yang, 2011).

Higher quality is positively associated with financial performance (Craig and Douglas, 1982; Phillips, Chang and Buzzell, 1983; Schoeffler, Buzzell and Heany, 1974; Zakuan, Yusof, Laosirihongthong and Shaharoun, 2010). Further, implementation of total quality management (TQM) practices has a positive effect on non-financial performance and this direct effect mediates the indirect effect of TQM on financial performance (Duh, Hsu and Huang, 2012). In this study, national firms provide services to public companies and assume stricter legal liabilities but regional and local firms rendering services to private companies situate in a loose legal liability regime. This study expects that service quality is a more important determinant of performance in the national firms, but firm size is more important in the regional and local firms. To articulate the above expectations, this study develops the following hypotheses.

H1a: Service quality is a more important performance determinant than firm size in the national firms.

H1b: Firm size is a more important performance determinant than service quality in the regional firms.

H1c: Firm size is a more important performance determinant than service quality in the local firms.

A corporation should seek to respond to the external environment effectively to gain competitive advantages, or competitive forces (Porter, 1990). Business strategies serve to exploit a corporation's capability as a competitive weapon to achieve its mission and objectives. Business strategies link external market requirement and internal organizational and technological resources, capability, and competitive advantage. The environment-strategy-performance (ESP) perspective posits that specific environmental conditions have a corresponding preferred strategic response (Volberda and Lewin, 2003; Tan and Tan, 2005). Previous study documents that audit firms take different strategies as a means of organizational adaptation, and a strong relationship exists between strategy types and performance (Rescho, 1987).

Audit firms may provide different practices, including audits of financial statements, tax planning, tax appeal and tax litigations, business administration consultation, accounting and bookkeeping. Of the practices offered, audits and accounting and bookkeeping have been provided for years and thus are often referred to as traditional services. In contrast, tax planning, tax appeal and tax litigations, and business administration consultation are referred to as non-traditional services (Banker, Chang and Natarajan, 2005). Different service provisions need different professional skill and expertise, thereby leading to different strategic types adopted by audit firms. Based on Miles and Snows (1978) and Jauch and Glueck (1989) and considering the audit market peculiarity, this study establishes business strategy typologies. We define audit firms only providing traditional services as the stability firms because their business strategy is to continuously operate in the existing market. For audit firms simultaneously offering both traditional and non-traditional services, their business strategy is to transcend the scope of businesses from traditional into non-traditional services. They are defined as expansion firms. As national firms always provide both traditional and non-traditional services, they only take the expansion business strategy. Both regional and

local firms offer either traditional services only or both services at the same time. They take expansion or stability business strategy. Hence, we have expansion national firms, expansion regional firms, expansion local firms, stability regional firms, and stability local firms.

Taiwanese auditing industry experienced three significant regulatory changes in the past two decades. Beginning in 1988, the Examination Yuan has raised the passing rate of the Certified Public Accountant uniform examination, resulting in substantial increases in the number of qualified practitioners and in market competition. In 1998, the Fair Trade Commission abolished the long-standing audit fee standards, established by the TICPA, to ensure fair audit market competition. Cancelling the audit fee standards adversely affects the traditional service market. Moreover, the Ministry of Finance established the tax agent system and legalized the provisions of corporate registration and accounting and bookkeeping services by tax agents to small and medium-sized entities (SMEs) in 2004. Both regional and local audit firms have provided the same traditional services to the SMEs for years.

Tax agent legalization negatively influences both firms because of the competitive advantages the tax agents possess for a relatively lower service fee and easy access by clients. Many companies facing recent worldwide competition and business globalization have consulted with a professional management advisor about business administration and information technology to advance their international competitiveness. In practice, audit firms have provided services to the same clients for years and are familiar with the clients' daily operation and financial condition. Equipped with a long-term partnership and close client relations, audit firms gain a more favorable position in providing non-traditional services than an ordinary professional consulting firm, such as McKinsey and Company. Providing non-traditional services normally requires greater involvement and communication between audit firms and clients to meet specific service demands. Unlike traditional services, non-traditional services are not regulated and their provisions are more flexible in formats, timing, and places. These services are tailor-made with no service fee standard, making them more profitable than traditional ones.

Consequently, non-traditional services create unlimited business opportunities for audit firms to expand their scope of businesses. Beginning in the 1990s, auditors began shifting their human resources from traditional, low-margin revenue product areas of auditing and accounting into relatively new, high-margin revenue product areas of non-traditional services (Banker et al., 2005). As defined earlier, expansion firms offer both traditional and non-traditional services but stability firms render traditional services only. The joint provisions of these two services theoretically create synergy and knowledge spillover effects for audit firms (Simunic, 1984; Beck, Frecka and Somomon, 1988). Consequently, we expect that operating performance of expansion firms is better than that of stability firms and hypothesize:

H2a: Performance of expansion regional firms is better than that of stability regional firms.

H2b: Performance of expansion local firms is better than that of stability local firms. Given varied business strategies taken by audit firms, whether the extent of performance effects of service quality and firm size differs? To the best of our knowledge, no prior study exists for these issues. To acquire further evidences, we establish the following non-directional hypotheses.

H3a: The extent of performance effects of service quality differs between stability regional firms and expansion regional firms.

H3b: The extent of performance effects of firm size differs between stability regional firms and expansion regional firms.

H3c: The extent of performance effects of service quality differs between stability local firms and expansion local firms.

H3d: The extent of performance effects of firm size differs between stability local firms and expansion local firms.

Previously, we expect that service quality is a more important determinant of performance in the national firms, but firm size is a more important determinant in the regional and local firms. This study asserts that the extent of performance effects of service quality in the national firms is higher than that of in the regional and local firms. In contrast, the extent of performance effects of firm size in the national firms is lower than that of in the regional and local firms. This study hypothesizes:

H4a: The extent of performance effects of service quality in national firms is higher than that of in regional firms.

H4b: The extent of performance effects of service quality in the national firms is higher than that of in local firms.

H4c: The extent of performance effects of firm size in national firms is lower than that of in regional firms.

H4d: The extent of performance effects of firm size in national firms is lower than that of in local firms.

In the local firms, both operating and administrative responsibilities fall on the sole proprietors. In regional firms, a partnership firm, two or more partners share the management functions and are personally responsible for all of the firm's actions and liabilities. Thus it is advantageous for each partner to specialize in a different area of the firm's practices. The varied specialization among partners establishes a complimentary network to offer diversified services for clients. High heterogeneity of partner specialization facilitates client solicitation and enhances the competitive advantage of partnership firms (Hitt, Ireland, Camp and Sexton, 2001; Pennings, Lee and Witteloostuijn, 1998). Whether the extent of performance effects of service quality and firm size differs between regional and local firms? Because no prior study examines this issue, we establish the following non-directional hypotheses to acquire further evidences.

H4e: The extent of performance effects of service quality differs between regional and local firms.

H4f: The extent of performance effects of firm size differs between regional and local firms.

DATA AND METHODOLOGY

Data

Empirical data are from the 1995-2009 Survey Report of Audit Firms in Taiwan, published by the Financial Supervisory Commission (FSC). To collect business information on the public accounting profession for macro-economic analysis and industrial policy formation, the FSC administers the survey over all registered audit firms annually. Because the FSC administers the survey pursuant to the Statistics Act, the Survey Report reveals an annual response rate of over eighty percent. As the sample period of this study is 15 years, this study deflates all monetary variables by the yearly Consumer Price Index to account for inflation. Original number of observation is 10,985 during sample period. This study deletes firm-year observations that newly established in the survey year and that with dependent variables having values more or less than three standard deviations away from their means. The final number of observations is 10,087. The number (percentage) of observations for national firms is 852 (8.45%) and that of regional and local firms is 2,338 (23.17%) and 6,897 (68.38%), respectively. Further, the number of stability regional and local firms is 1,691 and 3,128. The number of expansion regional and local firms is 647 and 3,769.

Empirical Model

The empirical data of this study come from registered audit firms in Taiwan, an industrial data. From the perspective of industrial economics and based on the Structure-Conduct-Performance (S-C-P) theoretical framework (Cowling and Waterson, 1976), this study establishes the following linear regression equation to test our hypotheses.

$$PERFORM = \alpha_0 + \alpha_1 HC_QUALITY + \alpha_2 MKS + \alpha_3 DUMMY + \alpha_4 HC_QUALITY * DUMMY + \alpha_5 MKS * DUMMY + \alpha_6 DIV + \alpha_7 AGE + \alpha_8 LEV + \alpha_9 TAIEX + \varepsilon$$

where:

Perform	=	Performance of Audit Firms;
HC_QUALITY	=	human capital-based service quality;
MKS	=	firm size;
DUMMY	=	DV_STRATEGY, dummy variable of business strategies;
	=	DV_PATTERN, dummy variable of market segments;
DIV	=	degree of business diversification of audit firms;
AGE	=	age of audit firms;
LEV	=	human capital leverage of audit firms; and
TAIEX	=	economic indicator.

Variable Definitions

This study defines performance as profit ratio, net income divided by total revenues. In accounting, net income equals total revenues deduct total expenses. Partners or sole proprietors are the owners and residual interest claimants of an audit firm. Their annual income comprises salaries received from and share of profit of the firm. Their salaries are a part of total expenses of the firm. The more the salaries, the less the net income of the firm is. It makes no difference for them to receive salaries or not in terms of their total annual income. In addition, the criteria for salary payments to them vary across firms. Based on prior studies (Chen et al., 2008), their salaries are added back to net income to reduce such an artificial noise. This study thus defines profit ratio (*PERFORM*) as follows.

$$PERFORM = (\text{total revenues} - \text{total expenses} + \text{partners' salaries}) / \text{total revenues}$$

Our first research variable is the human capital-based service quality (*HC_QUALITY*) extracted by a principal component analysis technique from human capital related factors suggested in prior studies. Meinhardt, Moraglio and Steinberg (1987) indicate that education of auditors is an important area affecting the quality of auditors' work. Aldhizer, Miller and Moraglio (1996) report some human capital attributes that are strongly associated with audit service quality, including that senior auditors are a certified public accountant (CPA), a symbol of professionalism, and general knowledge and experience of auditors. The British Financial Reporting Council (2006) identifies some principal drivers of audit quality such as the skill base (experience) of partners and staff, and the training given to audit personnel. Lee, Liu and Wang (1999) evaluate the effects of the 150-rule on audit market and incorporate auditor education and auditor effort as joint inputs of audit quality. On the basis of preceding studies, we extract an audit firm service quality from four factors related to human capital of an audit firm, including the academic educational level of auditors (Lee et al. 1999), the work experience of auditors (Aldhizer et al., 1996; FRC, 2006), professionalism (Aldhizer et al., 1996), and the continuing professional education of auditors (Meinhardt et al., 1987; FRC, 2006). The eigenvalue-greater-than-one rule indicates that the component obtained explains 76.86% of the total variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value of our dataset is 0.653 and Bartlett's test of sphericity reaches statistical significance ($\chi^2 = 4,218$; $p < 0.000$). This indicates that our empirical data are suitable for principal component analysis.

Another variable of interest in this study is the firm size (*MKS*), assessed by market share of audit firms. Moreover, this study sets a dummy variable of organizational pattern (*DV_PATTERN*) to compare the performance among the three sub-samples, national, regional, and local firms. Next, this study establishes dummy variable of business strategy (*DV_STRATEGY*) to distinguish audit firms taking stability strategy from expansion strategy. In addition to the variables of interest, some other factors affecting performance are included as control variables. Diversity in service lines will enhance 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). We measure the degree of business diversification of audit firms (*DIV*) by an Entropy index and expect a positive effect on performance. In practice, audit firms accumulate human resources and clients over time. Based on prior studies (Chen et al., 2008; Collins-Dodd et al., 2004), this study expects a positive association between age of audit firms (*AGE*) and performance. Audit firms render services by a team composed of a partner (leader) and some assistants. The number of assistants working with a partner affects the performance. Based on Hitt et al. (2001), this study defines human capital leverage of audit firms (*LEV*) as the number of assistants working with a partner. This study uses it to depict the human capital structure of audit firms and expects it to be negatively related to performance. Research period of this study is 15 years and spans over two centuries. As a professional organization, audit firms are affected by local economy or environment factors (e.g., Reynolds and Francis, 2001). Economic indicator (*TAIEX*), Taiwan Stock Exchange Market-Value Weighted Index, is included to control the effects from external environment factors. However, auditors provide services to the same clients for years and most of their practices are statutory, making the effects of environment factors on performance limited. Accordingly, this study does not specify a directional prediction on the relationship between economic indicator and performance.

RESULTS

Descriptive Statistics

Table 1 lists the descriptive statistics for our dependent and research variables. National firms have mean profit ratio (*PERFORM*) of 24.24%, higher than that of regional firms (21.48%) and local firms (18.39%). Human capital-based service quality (*HC_QUALITY*) of national firms is 0.5738, and that of regional and local firms is -0.0321 and -0.0338, respectively. The negative human capital-based service quality results from the standardization of coefficients. Firm size (*MKS*) indicates that, on average, national firms have higher market share (1.19%) compared to regional (0.09%) and local firms (0.03%). Dummy variable of business strategy (*DV_STRATEGY*) reveals 28% of the regional firms and 55% of the local firms take expansion type strategy. Finally, dummy variable of organizational pattern (*DV_PATTERN*) shows that the number of regional firms is about one third that of local firms.

Table 1: Descriptive Statistics

Variables		Sub-samples			
		National	Regional	Local	Regional/Local
<i>PERFORM</i>	Mean	0.2424	0.2148	0.1839	—
	S.D.	0.1039	0.1578	0.2125	—
<i>HC_QUALITY</i>	Mean	0.5738	-0.0321	-0.0338	—
	S.D.	0.7586	0.7409	0.6145	—
<i>MKS</i>	Mean	0.0119	0.0009	0.0003	—
	S.D.	0.0293	0.0010	0.0003	—
<i>DV_STRATEGY</i>	Mean	—	0.28	0.55	—
	S.D.	—	0.45	0.50	—
<i>DV_PATTERN</i>	Mean	—	—	—	0.33
	S.D.	—	—	—	0.44
<i>DIV</i>	Mean	0.6064	0.4472	0.4054	—
	S.D.	0.1236	0.1442	0.1545	—
<i>AGE</i>	Mean	17	10	10	—
	S.D.	11	8	9	—
<i>LEV</i>	Mean	10	7	7	—
	S.D.	6	4	5	—
<i>TAIEX</i>	Mean	6,189	6,287	6,223	—
	S.D.	1,385	1,312	1,347	—

Table 1 shows the descriptive statistics for variables used in regression model. *PERFORM* is equal to profit ratio of audit firms. *HC_QUALITY* is human capital-based service quality. *MKS* represents the audit firm size. *DV_STRATEGY* is a dummy variable of business strategy. *DV_PATTERN* is a dummy variable of organizational pattern. *DIV* is the degree of business diversification of audit firms. *AGE* represents the age of audit firms. *LEV* stands for the human capital leverage of audit firms. *TAIEX* is an economic indicator.

Regression Results

Association between service quality, firm size and performance (H1a, H1b, and H1c) Table 2 reports the empirical results for the effects of human capital-based service quality and firm size on performance in the national, regional, and local firms. Panel A lists the regression results and Panel B Wald test results. The explanatory power of models (adjusted R²) ranges between 0.315 and 0.595, implying that the three 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 (VIFs). In addition, we estimate the standardized regression coefficients (*Beta*) for each independent variable to ease comparisons between variables. The preceding three econometric treatments apply to all regression models in this study.

For national firms, the coefficient on human capital-based service quality (*HC_QUALITY*) is significantly positive (t = 3.107, p < 0.01) but that of firm size (*MKS*) is insignificantly positive. Panel B displays that the value of standardized coefficient on service quality (α_1) (0.196) is higher than that of firm size (α_2) (0.038) (F = 57.610, p < 0.01). This represents that service quality is a more important performance determinant than firm size in the national firms. H1a receives a support. Empirical results for regional firms indicate that the relation between human capital-based service quality (*HC_QUALITY*) and performance is insignificantly positive but the relation between firm size (*MKS*) and performance is significantly positive (t = 9.879, p < 0.01).

Table 2: Results of the Performance Effects of Service Quality and Firm Size

Panel A: Regression Results					
		National Firms	Regional Firms	Local Firms	
Research Variables (Predicted Sign)					
HC_QUALITY(+)		0.196*** (3.107)	0.022 (0.661)	-0.024 (-1.444)	
MKS(+)		0.038 (0.698)	0.231*** (9.879)	0.342*** (20.983)	
Control Variables (Predicted Sign)					
DIV(+)		0.083** (2.367)	0.082*** (4.041)	0.043*** (3.655)	
AGE(+)		0.007 (0.210)	-0.041 (-1.037)	-0.026 (-1.212)	
LEV(-)		-0.412*** (-9.409)	-0.346*** (-9.929)	-0.345*** (-16.803)	
TAIEX(?)		0.044 (1.346)	0.032 (1.646)	0.034*** (2.974)	
Adjusted-R ²		0.595	0.315	0.404	
F-statistic		115.84**	74.90***	106.50***	
Number of observations		852	2,338	6,897	
Panel B: Test of Difference in Coefficients					
$\alpha_1 - \alpha_2 = 0$	+/-	$\alpha_1 - \alpha_2$ (F-statistic) 0.158*** (57.610)	$\alpha_1 - \alpha_2$ (F-statistic) -0.209*** (82.410)	$\alpha_1 - \alpha_2$ (F-statistic) -0.366*** (254.503)	

Panel A of this table represents the empirical results for the effects of human capital-based service quality and firm size on performance in the national, regional, and local firms. Empirical results for national firms demonstrate that the performance effect of the human capital-based service quality is significantly positive but that of firm size is insignificantly positive. Empirical results for regional and local firms indicate that the relation between human capital-based service quality and performance is insignificantly positive but the relation between firm size and performance is significantly positive. Panel B represents the Wald test results. The value of standardized coefficient on service quality is higher than that of firm size in the national firms. The value of standardized coefficient on service quality is less than that of firm size in the regional and local firms. *, **, *** Denote one-tailed significance at the 10 %, 5 % and 1 % levels. Variables are defined in Table 1.

Furthermore, Panel B shows that the value of standardized coefficient on service quality (α_1) (0.022) is less than that of firm size (α_2) (0.231) (F = 82.410, p < 0.01). This means that firm size is a more important performance determinant than service quality in the regional firms and lends a support to H1b. Empirical results of local firms resemble that of regional firms. The relation between human capital-based service quality (*HC_QUALITY*) and performance is insignificantly positive but the relation between firm size (*MKS*)

and performance is significantly positive ($t = 20.983, p < 0.01$). The value of standardized coefficient on firms size (α_2) (0.342) is significantly greater than that of human capital-based service quality (α_1) (-0.024) ($F = 254.503, p < 0.01$). H1c is supported.

Effects of Business Strategies on Performance (H2a and H2b)

This section examines the effects of business strategies on performance. Because national firms take expansion type strategy only, Table 3 displays regression results for regional and local firms. As indicated, the adjusted R^2 ranging between 0.355 and 0.481 implies a moderate model specification. Column (A) displays the results for regional firms. The coefficient on dummy variable of business strategy ($DV_STRATEGY$) is significantly negative ($t = -1.756, p < 0.10$). This indicates that the performance of expansion regional firms is better than that of stability regional firms and lends a support to H2a. For the local firms, column (C) reports that the coefficient on dummy variable of business strategy ($DV_STRATEGY$) is negative but insignificant. This means no significant differences in the performance between expansion and stability local firms. Accordingly, H2b is not supported.

Results of the Performance Effects of Service Quality and Firm Size under Varied Business Strategies (H3a, H3b, H3c and H3d)

Previously stated in Table 2, firm size is a more important performance determinant than service quality in both regional and local firms. Further, columns (A) and (C) in Table 3 indicate that the performance of expansion regional firms is better than that of stability regional firms, but no significant differences in performance exist between expansion and stability local firms.

Table 3: Regression Results for the Effects of Business Strategy on Performance

	Regional Firms		Local Firms	
	(a)	(b)	(c)	(d)
Research Variables (Predicted Sign)				
<i>hc_quality(+)</i>	0.018 (0.533)	-0.009 (-0.240)	-0.026 (-1.455)	-0.016 (-0.815)
<i>mks(+)</i>	0.227*** (9.682)	0.233*** (9.799)	0.335*** (20.881)	0.325*** (19.306)
<i>dv_strategy(-)</i>	-0.039* (-1.756)	—	-0.024 (-1.352)	—
<i>hc_quality *dv_strategy(?)</i>	—	0.058** (2.428)	—	-0.010 (-0.628)
<i>mks*dv_strategy(?)</i>	—	0.033 (1.524)	—	0.060*** (4.389)
Control Variables (Predicted Sign)				
<i>div(+)</i>	0.066*** (2.956)	0.085*** (3.957)	0.041*** (3.217)	0.056*** (4.589)
<i>age(+)</i>	-0.043 (-1.133)	-0.040 (-1.154)	-0.022 (-1.194)	-0.026 (-1.230)
<i>lev(-)</i>	-0.343*** (-9.807)	-0.350*** (-9.969)	-0.343*** (-16.760)	-0.355*** (-17.221)
<i>taiex(?)</i>	0.032 (1.619)	0.034 (1.642)	0.033*** (2.968)	0.035*** (3.051)
adjusted-r ²	0.355	0.397	0.404	0.481
f-statistic	79.384***	73.788***	101.292***	92.597***
number of observations	2,338	2,338	6,897	6,897

Table 3 displays the OLS regression results of the relationship between business strategy and financial performance in the regional and local firms. Column (A) indicates that the performance of expansion regional firms is better than that of stability regional firms. Column (B) shows that the extent of performance effects of service quality in stability regional firms is higher than that in expansion regional firms. Column (C) reports that no significant differences in the performance between expansion and stability local firms. Column (D) represents that the extent of performance effects of firm size in stability local firms is higher than that in expansion local firms. *, **, *** Denote one-tailed significance at the 10 %, 5 % and 1 % levels. Variables are defined in Table 1.

Whether the extent of performance effects of service quality and firm size differs for audit firms taking different business strategies? To this, we conduct analyses over regional and local firms and display empirical results in columns (B) and (D) of Table 3, respectively. Column (B) lists the results for regional firms. First, the coefficient on the interaction term between human capital-based service quality and dummy variable of business strategy ($HC_QUALITY*DV_STRATEGY$) is positive significantly ($t = 2.428, p < 0.05$). This represents that the extent of performance effects of service quality in stability regional firms is higher than that in expansion regional firms. H3a is supported. Next, the coefficient on the interaction term between firm size and dummy variable of business strategy ($MKS*DV_STRATEGY$) is positive but insignificant.

This indicates no differences in the extent of performance effects of firm size between stability and expansion regional firms. Thus, H3b receives no support. For the local firms, column (D) reports a negative but insignificant coefficient on the interaction term between human capital-based service quality and dummy variable of business strategy ($HC_QUALITY*DV_STRATEGY$). This means no significant differences in the extent of performance effects of service quality between stability and expansion local firms. H3c is not supported. Further, column (D) displays a significantly positive coefficient on the interaction term between firm size and dummy variable of business strategy ($MKS*DV_STRATEGY$) ($t = 4.389, p < 0.01$). This represents that the extent of performance effects of firm size in stability local firms is higher than that in expansion local firms and lends a support to H3d.

Effects of Service Quality and Firm Size on Performance for Different Subsamples (H4a, H4b, H4c, H4d, H4e and H4f)

This section investigates whether the extent of performance effects of service quality and firm size differs among national, regional, and local firms. Table 4 displays the empirical results. As shown, the explanatory power of models (adjusted R^2) lies between 0.165 and 0.544, indicating a moderate model specification. In the Column (A), coefficient on the interaction term between human capital-based service quality and dummy variable of organizational pattern ($HC_QUALITY*DV_PATTERN$) is positive but insignificant. This represents no significant differences in the extent of performance effects of service quality between national and regional firms. H4a is not supported. However, the coefficient on the interaction term between firm size and dummy variable of organizational pattern ($MKS*DV_PATTERN$) is significantly negative ($t = -6.119, p < 0.01$). This stands for that the extent of performance effects of firm size in the national firms is lower than that of in the regional firms, lending a support to the H4c. Column (B) shows that coefficient on the interaction term between human capital-based service quality and dummy variable of organizational pattern ($HC_QUALITY*DV_PATTERN$) is negative but insignificant.

As no significant differences in the extent of performance effects of service quality exist between national and local firms, H4b receives no support. The coefficient on the interaction term between firm size and dummy variable of organizational pattern ($MKS*DV_PATTERN$), however, is significantly negative ($t = -15.651, p < 0.01$). This denotes that the extent of performance effects of firm size in the national firms is lower than that of in the local firms, lending a support to the H4d. In the column (C), coefficient on the interaction term between human capital-based service quality and dummy variable of organizational pattern ($HC_QUALITY*DV_PATTERN$) is negative but insignificant. This represents no significant difference in the extent of performance effects of service quality between regional and local firms. H4e is not supported. However, the coefficient on the interaction term between firm size and dummy variable of organizational pattern ($MKS*DV_PATTERN$) is significantly negative ($t = -16.586, p < 0.01$). This means that the extent of performance effects of firm size in the local firms is higher than that of in the regional firms, lending a support to the H4f.

Table 4: Results of the Performance Effects of Service Quality and Firm Size under Different Subsamples

	National-Regional (A)	National-Local (B)	Regional-Local (C)
Research Variables (Predicted Sign)			
<i>hc_quality</i> (+)	-0.108*** (-3.993)	-0.094*** (-5.791)	-0.021 (-1.226)
<i>mks</i> (+)	2.083*** (6.377)	7.654*** (15.781)	0.650*** (21.103)
<i>hc_quality *dv_pattern</i> (?)	0.038 (1.332)	-0.012 (-0.673)	-0.009 (-0.688)
<i>mks*dv_pattern</i> (?)	-1.989*** (-6.119)	-7.549*** (-15.651)	-0.476*** (-16.586)
Control Variables (Predicted Sign)			
<i>div</i> (+)	0.170*** (9.322)	0.115*** (9.961)	0.064*** (6.227)
<i>age</i> (+)	0.004 (0.195)	0.001 (0.112)	-0.029 (-1.196)
<i>lev</i> (-)	-0.211*** (-8.585)	-0.208*** (-12.097)	-0.323*** (-18.416)
<i>taiex</i> (?)	0.031* (1.815)	0.027** (2.422)	0.033*** (3.292)
adjusted-r ²	0.165	0.334	0.544
f-statistic	31.796***	64.368***	104.724***
number of observations	3,190	7,749	9,235

Column (A) of Table 3 reports the empirical results of the performance effects of service quality and firm size between national and regional firms. It demonstrates that the extent of performance effects of firm size in the national firms is lower than that of in the regional firms. Column (B) shows that the empirical results of the performance effects of service quality and firm size between national and local firms. It denotes that the extent of performance effects of firm size in the national firms is lower than that of in the local firms. Column (C) indicates the empirical results of the performance effects of service quality and firm size between regional and local firms. It demonstrates that the extent of performance effects of firm size in the local firms is higher than that of in the regional firms. *, **, *** Denote one-tailed significance at the 10 %, 5 % and 1 % levels. Variables are defined in Table 1.

Additional Tests

Critical events: The sampling period of this study experiences two critical events that probably impact the performance of audit firms. One is the 1997 Asian financial crisis storm and the other is the 2002 contagious accounting scandal in the US. To examine the effects of the two events on audit firms, this study set two yearly dummy variables for additional tests, *Y1997* and *Y2002*. First, this study conducts uni-variate tests to compare the differences in performance between event years and other years for national, regional, and local firms. The 1997 profit ratio of national firms is 25.98%, which is insignificantly different from that of other years, 24.19% ($t = 1.264$). Similarly, the differences in profit ratio of national firms between 2002 and other years are insignificant ($t = -0.717$). The 1997 and 2002 profit ratios of regional firms are 23.41% and 21.01%, respectively. As the situation in the national firms, the event year profit ratios of regional firms are insignificantly different from that of other years ($t = 1.550$ and -0.286). Finally, local firms had profit ratios of 18.80% in 1997 and 14.39% in 2002. Although the differences in profit ratio between 1997 and other years are insignificant ($t = 0.119$), the differences reach significance between 2002 and other years ($t = -3.815$).

Because uni-variate tests do not control other factors affecting performance, this study includes the two yearly dummy variables into the regression model and re-runs the same analyses as those reported in Tables 3 to 6. Empirical results (not reported here for brevity) indicate that the coefficients on yearly dummy variables (*Y1997* and *Y2002*) are positive but insignificant and other results do not change substantially. Taking the results from uni-variate test and regression analyses together, both the 1997 Asian financial

crisis storm and the 2002 contagious accounting scandal seem to have immaterial effects on performance of Taiwanese audit firms. For long, audit firms have provided traditional services which are statutory and required businesses by related laws and regulations. In addition, audit firms render services to the same clients for years and thereby establish long term partnership between them. As a result, changes in external environment have minimal impact on audit firms.

International audit firms: In this study, national firms include big international audit firms, also referred to as Big N firms. They are much larger in size compared to other national firms. Big firms invest resources to create a brand name reputation and provide services with high quality. Several prior studies document the existence of a Big N audit fee premium (Francis, 1984; Palmrose, 1986; Johnson et al., 1995; Craswell et al., 1996). Whether the audit firms with audit fee premium result in better performance than others? To this, we first compare the performance between Big N firms and non-Big N firms. Uni-variate test results indicate no significant difference in profit ratio between Big N firms (24.37%) and non-Big N firms (24.22%) ($t = 0.12$).

Next, this study sets a Big N dummy variable and includes it into the empirical models containing national firms. After re-running the regression analysis, empirical results (not reported here for brevity) show that the performance of Big N firms is not significantly better than that of non-Big N firms ($t = 0.409$). Manpower is the major assets of audit firms and salaries expenses account for 69.9% of total expenses in an audit firm during the sampling period. Practitioners argue that the salary expenses of Big N firms are higher than that of non-Big N firms. More revenues earned due to audit fee premium are offset by the higher salary expenses incurred, resulting in profit ratio of Big N firms not higher than non-Big N firms.

CONCLUSION

This study investigates the effects of service quality and firm size on performance of audit firms in Taiwan. Empirical data are from the 1995-2009 Survey Report of Audit Firms in Taiwan, published by the Financial Supervisory Commission (FSC). Empirical results indicate that service quality is more important than firm size in the performance determinant of national firms. However, firm size is a more important performance determinant in the regional and local firms. Next, performance of expansion regional firms is better than that of stability regional firms. The extent of performance effects of service quality of stability regional firms is higher than that of expansion regional firms. The extent of performance effects of firm size of stability local firms is higher than that of expansion local firms.

Finally, the extent of performance effects of firm size in the national firms is lower than that of in the regional and local firms. The extent of performance effects of firm size in the local firms is higher than that of in the regional firms. With the findings, this study contributes the following knowledge to literature of quality management. When audit firms situate in a stricter legal liability market, their competitive weapons are service quality. If audit firms locate in a less regulated market in which homogeneous services are provided, their survival measures are market share enlargement. National firms are larger in size than regional and local firms. Our empirical results of national firms demonstrate that big is not necessarily beauty. Instead, the enhancement of service quality is warranted. The findings of regional and local firms, however, reveal that big is beauty given the threshold of service quality is attained. In addition, our findings that expansion regional firms outperform stability regional ones suggest practitioners of regional audit firms to offer both traditional and non-traditional services to acquire the spill-over effects and audit cost savings from joint provisions of both services. Audit firms are a professional service organization and render services with expertise.

This study uses the technical competencies of employees in audit firm to measure the service quality. Other factors, such as audit job hours and culture in an audit firm, also determine the service quality but are not incorporated into the regression model due to data availability, resulting in a limitation of this study. Knowledge management is a critical factor for the survival and continuing development of audit firms. Few prior studies on knowledge management are conducted in the auditing industry. This constitutes a promising avenue for future study.

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