Chiao Da Management Review
Vol. 30 No. 2, 2010
pp. 107-146

公司治理如何影響企業績效？代理成本之中介效果

How Does Corporate Governance Affect Firm Performance? The Mediating Role of Agency Costs

黃志仁 Chih-Jen Huang
靜宜大學 財金系
Department of Finance, Providence University
薛敏正[1] Min-Jeng Shiue
台北大學 會計學系
Department of Accountancy, National Taipei University
張瑀珊 Yu-Shan Chang
淡江大學 會計學系
Department of Accounting, Tamkang University

摘　要：本文嘗試納入代理成本之中介效果，以 LISREL 方法分析公司治理對企業績效的影響。本文先驗證「公司治理對績效」與「公司治理對代理成本」的直接影響關係，結果顯示公司治理與企業績效呈正相關，而公司治理則與代理成本呈負相關，與預期相符。在納入代理成本為中介變數後，公司治理能有效控制代理成本進而提升績效，顯示代理成本對於「公司治理影響績效」具有部份中介的效果。亦即，公司治理能有效降低代理成本，進而對績效有所提升，顯示降低代理問題是公司治理提升績效之重要途徑。本文在以下三方面對於「公司治理影響績效」文獻具有貢獻：(1)點出代理成本在其中扮演關鍵的中介角色；(2)支持治理機制同時存在興利與除弊的功能；(3)在相關議題上提供未來可能的研究方向。

關鍵詞：公司治理；代理成本；公司績效；中介效果

Abstract: This is the first study on the mediating effect of agency costs on the association between corporate governance and firm performance. In the LISREL setting, we first examine the direct effect of governance on firm performance and

[1] Corresponding author: Department of Accountancy, National Taipei University, Taipei, Taiwan, E-mail: smj@mail.ntpu.edu.tw

agency costs. The results indicate a positive (negative) correlation between governance and firm performance (agency costs). We further include agency costs as a mediating variable; the results show that governance is negatively correlated with agency costs at a conservative level, whereas the impact of governance on firm performance remains significantly positive. This evidence indicates that agency costs play a partial intermediary role in the relationship between governance and firm performance. Specifically, decreasing agency costs is an important way for governance to improve firm performance. This paper contributes to the literature on the association between governance and firm performance by: (1) identifying the mediating effect of agency costs, (2) highlighting both the beneficial and maladministration-mitigating roles of governance, and (3) initiating a new research aspect for related topics.

Keywords: Corporate governance; Agency costs; Corporate performance; Mediating effect

1. Introduction

The Organization for Economic Cooperation and Development (OECD) emphasized the importance of corporate governance in 1999; it proclaimed that corporate governance must perform performance-enhancing and safeguarding functions that maximize firm profits and shareholder value. However, the academy has yet to establish the relevance of the influence of corporate governance on firm performance. Little research has investigated both the performance-enhancing and safeguarding functions of corporate governance simultaneously. This study builds on the existing research on the influence of corporate governance on firm performance in order to provide a clear understanding of the relationship between the two. We consider agency costs to be a mediating variable in the relationship between corporate governance and firm performance and investigate whether corporate governance can simultaneously perform both performance-enhancing and safeguarding functions. If corporate governance has direct performance-enhancing and safeguarding functions, it must be effective in controlling internal agency problems and improving firm

performance. We argue that researchers may have overlooked the possibility of agency costs serving as a mediator in this relationship and therefore presented mixed results.

The mediating effect refers to the mediating mechanism between the independent and dependent variables. Barron and Kenny (1986) contend that three conditions must be satisfied for a mediating variable in a regression assumption: (1) there must be a significant correlation between the independent and mediating variables; (2) there must be a significant correlation between the mediating variable and dependent variables; and (3) the inclusion of the mediating variable decreases the strength of the direct relationship between the independent and dependent variables. If, after the inclusion of a mediating variable, the direct effect between the independent and dependent variables remains statistically significant, it is a partial mediating effect; if, however, the direct effect is insignificant, it is a full mediation effect. In a LISREL setting, this paper first employs confirmatory factor analysis (CFA) to obtain the representative observable variables for each latent variable and establish a completely fit model. It then proceeds with analyses of direct and mediating effects among latent variables.

Joreskog and Sorbom (1993) point out that with multicollinearity among independent variables, the LISREL analysis is a more valid method for estimating a model than a simple regression method is. Furthermore, when a certain variable (e.g. agency costs) is probably a dependent variable of another variable (e.g. corporate governance) and at the same time, is an independent variable of another variable (e.g. firm performance), LISREL can analyze the complex causal relationships better than ordinary path analysis. Moreover, LISREL is not constrained by the hypothesized conditions of the regression methods. Thus, this paper aims to adopt LISREL in analyzing the influence of corporate governance on firm performance and in determining whether agency costs exists as a mediating variable between them.

Ang *et al.* (2000) investigate the corporate governance mechanism from an agency costs perspective and argue that an effective reduction in agency costs helps to increase firm value. Shiue *et al.* (2007) examine the mediating effect of

earnings management on the relationship between corporate governance and firm performance; they discover that corporate governance can effectively contain intended earnings management within a firm and at the same time, can increase firm performance.

This study differs from previous studies in that we use a broader view to analyze the mediating role that agency costs play. First, we test the direct effects of corporate governance on firm performance and on agency costs. We then proceed by examining the mediating effect of agency costs on the relationship between corporate governance and firm performance and discuss whether beneficial and maladministration-mitigating functions can together increase firm performance.

The sample used in this study is a set of listed companies in Taiwan from 2000 to 2006. We find a positive direct effect of corporate governance on firm performance and a negative direct effect of corporate governance on agency costs, both consistent with the expectations of this study. The evidence also indicates the mediating role played by agency costs. When agency costs are included as a mediating variable, the direct effect of corporate governance on firm performance increases dramatically, showing that a failure to control agency costs will suppress the beneficial function in corporate governance. The results provide evidence that reducing agency costs is an important way for Taiwan's corporate governance to increase firm performance.

Since the effect of corporate governance on firm performance remains significant after the inclusion of agency costs as a mediating variable, agency costs exist as a partial mediator in the relationship between corporate governance and firm performance, showing that both beneficial and maladministration-mitigating functions exist for the corporate governance of Taiwanese firms. This study proposes that the neglect of agency costs as a mediating variable could be one of the critical reasons for the inconclusiveness in related literature.

This paper is organized as follows. The next section provides a literature review. Section 3 introduces the research methods, variable definitions, and data. Section 4 presents the empirical results. Finally, Section 5 concludes the study.

2. Literature Review and Hypothesis

Corporate governance has two functions: (1) helping in the effective implementation of firm policy, thus improving firm performance and (2) helping mitigate entrenching behavior in a firm. This section reviews the literature on the beneficial and mitigating functions of corporate governance and its mediating effects.

Corporate governance is a supervising mechanism for agents; it helps in controlling the agency costs brought about by information asymmetry and conflicts of interest (Berle and Means, 1932). Jensen and Meckling (1976) point out that partial shareholding by managers will incur mismanagement, tunneling, and thereby damaging firm value as well as the wealth of stockholders. Based on the job and risk characteristics of managers and shareholders, Fama and Jensen (1983) analyze firms' decision-making processes and contend that managers do not necessarily take shareholders' interests into consideration when making decisions, thereby resulting in agency costs. Agency costs increase with the debt ratio, which further influences firm performance (Jensen, 1986). Myers (2001) points out that debt cost contributes to a higher probability that firms will face a financial crisis, as well as higher bondholder risk, which aggravates the debt agency problem and reduces firm operating performance.

Previous research has not found a common ground on the beneficial role of good corporate governance in improving firm performance. McKinsey's report in 1999 indicates that, as compared to other firms in the same industry, Japanese and Taiwanese firms with good corporate governance experience a 20% abnormal stock return (24% for Korean firms; more than 25% for Thai and Indonesian firms), indicating that good governance mechanisms can increase firm value. Kim and Lee (2003) examine Korean firms during the Asian financial crisis and show that the magnitude of destructiveness resulting from agency costs is inversely dependent upon the firms' corporate governance. Gompers *et al.* (2003) find that firms with better corporate governance are associated with higher stock return, sales growth, and firm value. Black *et al.* (2006) use Tobin's Q and market-to-book ratio to measure performance and find similar results as in

Gompers *et al.* (2003). As for the ownership structure, Mehran (1995) finds a positive relationship between firm performance and the stockholding ratio of managers and outside directors. Agrawal and Knoeber (1996) and Steiner (1996) further state that inside directors who hold a high fraction of stocks are more likely to be informed about firm operating performance, which helps in the quality of decision-making on the board, thereby helping to increase firm performance. As for the board structure, Pearce and Zahra (1992) find that the ratio of outside directors has positively affected firm performance. Agrawal and Knoeber (1996) investigate the relationship between internal control mechanisms and firm performance and find that firm performance increases with the number of inside directors on the board.[2]

Yet, contrary results are also presented in the literature. Based on the entrenchment hypothesis, Jensen and Ruback (1983) propose that the board of directors usually engages in anti-takeover for their own job security. They found that the possibility of anti-takeover behavior and prerequisite consumption is increasing in the concentration of shares ownership held by directors and large shareholders. Yermack (1996), Conyon and Peck (1998), and Eisenberg *et al.* (1998) investigate the influence of board structure on firm performance and find a negative relationship between board size and the market value of the firm. Some studies find no relation between corporate governance and firm performance. Fama (1980) claims that manager' inclination to raise firm performance is dependent upon the competition in the labor market rather than upon the ownership structure. Gillies and Leblanc (2003) aim to verify whether a high-quality board helps maintain a firm's excellence, but are unable to identify the relationship between corporate governance and firm performance. Yermack (1996) and Bhagat and Black (2002) find no significant relationship between the ratio of outside or independent directors and firm performance. Demsetz and Villalonga (2001) and Balatbat *et al.* (2004) also point out that ownership structure has no impact on firm performance. Finally, Morck *et al.* (1988) find a nonlinear relationship between corporate governance and firm performance, but

[2] Agrawal and Knoeber (1996) also found that outside directors have a negative effect on firm performance.

influenced by the shares held by the board. Specifically, there is a positive relationship between corporate governance and firm performance when shares held by the board are below 5% or above 25%; there is, however, a negative relationship between them when shares held by the board is between 5% and 25%.

The literature on the mediating variables affecting corporate governance and firm performance is limited. Wu (2004) examines the mediating effect of the combinations of executive management officers' salary, R&D expenses, and ownership structure on firm value. The results show that R&D expenses have a positive mediating effect on the relationship between executive managers' salaries and firm value. Executive managers' salaries have a positive mediating effect on the relationship between R&D expenses and firm value; and the salaries of executive managers in high-tech firms have a negative mediating effect on the relationship between ownership structure and firm value. Chiang (2004) finds that non-financial performance has a mediating effect on salary strategy and financial performance. Shiue *et al.* (2007) investigate the mediating effect of earnings management on the relationship between corporate governance and firm performance and find that governance can improve firm performance by effectively controlling for intended earnings management.

Previous studies have shown that the existence of agency costs results in a tendency toward mismanagement and tunneling. The self-benefit motivation of agents will harm the performance and long-term development of a firm. Little research has investigated the mediating role of agency costs in the influence of corporate governance on firm performance. Building on the findings in related literature, this study attempts to understand whether beneficial and maladministration-mitigating functions can simultaneously arise from corporate governance in Taiwanese firms.

We believe that the inclusion of agency costs as a mediating variable can accurately capture the beneficial and maladministration-mitigating effects of corporate governance on firm performance. The results of this study will be helpful not only in clarifying the inconclusive results about the association between corporate governance and firm performance, but also in recommending

future research topics.

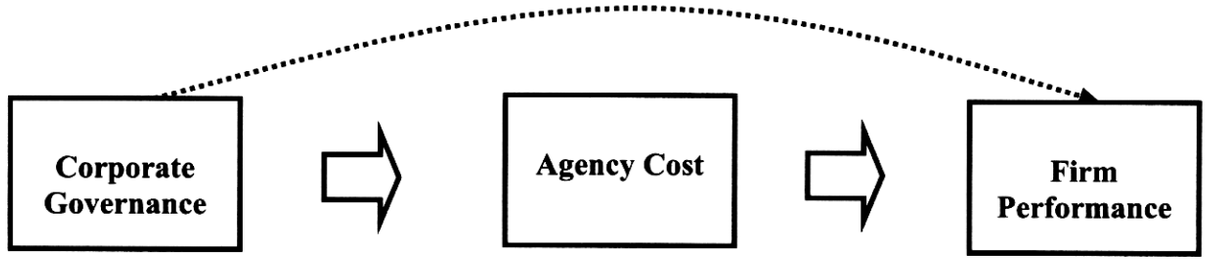
We hypothesize that:

Hypothesis 1: Agency costs have a mediating effect on the relationship between corporate governance and firm performance.

3. Research Method

We first measured the direct effect of corporate governance on firm performance, followed by the influence of corporate governance on agency costs. We then examined the mediating effect of agency costs in the influence of corporate governance on firm performance, in order to test for the existence of beneficial and maladministration-mitigating functions of corporate governance in the firms. Figure 1 shows the research framework for this study.

Figure 1
Research Framework



There is no generally accepted method for measuring corporate governance, agency costs, and firm performance in the literature; furthermore, using a proxy variable to measure each latent variable will easily result in bias, and will eventually affect empirical results. We performed a confirmatory factor analysis (CFA) on the relevant variables based on previous literature, in order to test the representativeness of the observed variables and to establish the complete fit for the research model. The description and definition of observable variables for each latent variable are given below.

3.1. Definition of Variables

3.1.1 Corporate Governance

Many methods are available for measuring corporate governance variables, yet the key point of measurement should be focused on effectively protecting different types of investors (Yen *et al.*, 2006). Bhagat and Jefferris (2002) assert that only considering a single governance mechanism will lead to overlooking the interaction effect between mechanisms, and will further lead to an error in inference. We use three latent variables to measure corporate governance: ownership structure, composition of the board of directors, and related party transactions. In ownership structure, Jensen and Meckling (1976) point out that when the manager's stockholding ratio is higher or when the ownership is more concentrated, the manager's behavior will not deviate far from the goal of maximizing shareholder value. Agrawal and Knoeber (1996) and Steiner (1996) believe that the higher the stock holding ratio for inside directors, the more in tune they are with the firms' operations; this pushes the board toward efficient and high-quality decision-making, thus effectively increasing firm performance. We used manager's stockholding ratio (SHA), family and personal stocks (SHB), direct stockholding ratio (SHY), ratio of separation of seats and shares (SHK), large stockholding ratio (SHC), and critical control level (SHO) as factors of ownership structure and performed a confirmatory factor analysis.

A common belief is that the composition of the board of directors plays an important role in the advantages and disadvantages of corporate governance. Cadbury (1999) believes that the focal point of corporate governance is the way in which the board of directors functions, because the board is responsible for changing and compensating executive managers; the board should actively protect or maintain shareholders' rights and should maximize its supervision functions. Fama (1980) maintains that when a director holds an internal management position within the firm, the board cannot be effective in supervising and decision-making, and this might even result in conspiracy between the manager and the director through misappropriating shareholders' wealth. Dobrzynski (1993) finds that the increased participation of independent directors in board

meetings leads to more objective decision-making within the board. Pearce and Zahra (1992) find that the ratio of independent and outside directors has a positive effect on firm performance. Combining the works of previous literature, we employ directors' seats ratio (DRA), directors' seats (DRN), supervisors' seats (DRC), directors' and supervisors' stock holding ratio (DRD), directors and supervisors pledged shares ratio (DRG), independent directors' and supervisors' seats ratio (DRE), and controlling supervisors' seats ratio (DRB) (Warfield *et al.*, 1995; Chen, 2004) in the CFA for the board of directors composition variables.

Finally, Yeh *et al.* (2002a) state that Taiwanese firms that have a high share of related party transactions will have a negative effect on corporate governance; thus, we include purchase of related party transactions (PAB), sales of related party (PAC), revenue from sales and process of related party (PAE), revenue from purchase and outsourcing of related party (PAF), related party accounts receivable ratio (PAQ), and related party accounts payable ratio (PAU) (Yeh *et al.*, 2002b; Chen, 2004) to capture the effect of related party transactions on corporate governance. CFA was carried out in order to observe for the variables, and the variable definitions are included in Table 1.

3.1.2 Agency Costs

Ang *et al.* (2000) use the rate of operation expense and the asset turnover rate to measure agency costs. Singh and Davidson III (2003) build on the work of Ang *et al.* (2000) and use SG&A costs to measure agency costs and capture managers' discretionary expenses. Yafeh and Yosha (2003) use Japanese firms as samples in their study and use discretionary expenses to measure agency costs. Their findings suggest that when large shareholders act as managers at the same time, they reduce discretionary expenses and in turn lessen agency costs. From the discussions in previous studies, we include discretionary cost ratio (AQA), free cash flows (AQD), asset turnover rate (AQE), SG&A costs (AQW), firm size (AQR), debt ratio (AQV), and operating cost ratio (AQN) as observable variables. Table 2 shows the observable variables obtained from CFA as well as the definition of agency costs.

Table 1

Definition and Observed Variables for Corporate Governance[a]

Construct	Variables	Definition
SH_COM	SHA	Stockholding ratio of internal directors/number of shares outstanding (end-of-year)
	SHB	Family and personal stockholding ratio/number of shares outstanding (end-of-year)
	SHY	Final controller (personal shares ratio + stockholding ratio of unlisted family firm + family mutual fund stockholding ratio)
	SHK	Seats of controlling rights/shares of controlling rights[b]
	SHC	Major stockholders number of shares held/number of shares outstanding (end-of-year)
	SHO	Degree of dispersion, final controller's stockholding ratio necessary for controlling the firm[c]
DIR_SUP	DRA	Controlling directors' seats/directors' seats
	DRN	Directors' seats
	DRC	Supervisors' seats
	DRD	Directors' and supervisors' number of shares held (end-of-year) /number of shares outstanding (end-of-year)
	DRG	Directors' and supervisors' shareholding pledged shares ratio (end-of-year)/number of shares outstanding (end-of-year)
	DRE	Independent directors' and supervisors' seats
	DRB	Controlling supervisors' seats/supervisors' seats
PAR_TRA	PAB	Related party's total import volume (end-of-year)/firm's total import volume (end-of-year)
	PAC	Related party's total sales volume (end-of-year)/firms' total sales volume (end-of-year)
	PAE	Revenue from sales and process of related party/operating income (end-of-year)
	PAF	Revenue from purchase and outsourcing of related party/ operating cost (end-of-year)
	PAQ	Related party total accounts receivable (end-of-year)/firm's total accounts receivable (end-of-year)
	PAU	Related party total accounts payable (end-of-year)/firm's total accounts payable (end-of-year)

[a]Ownership controlling rights, also termed voting rights, are adopted from the La Porta *et al.* (1999) method, assigning the extreme stockholding ratio in the controlling chain as the indirect stockholding. Seats of controlling rights: Final controlled directors' and supervisors' seats /overall directors' and supervisors' seats.

[b]Necessary controlling stocks held % (concentration percentage of ownership rights) is calculated based on Cubbin and Leech's (1983) formula.

Table 2

Definition and Observable Variables of Agency Costs[a]

Construct	Observed variables	Definition
AGE_COS	AQA	Total costs minus cost of sales, interest cost, and salary expenses/firm's net sales (end-of-year) [b]
	AQD	Earnings before depreciation less tax and interest, then subtract cash dividends/end-of-year total assets for previous period
	AQE	Firm's net operating income/total assets (end-of-year)
	AQW	Total selling, general and administrative expense/net operating income (end-of-year)
	AQR	Total assets (natural log)
	AQV	Total liabilities/total assets (end-of-year)
	AQN	Operating costs/net operating income (end-of-year)

[a]The observable variables for agency costs include discretionary cost ratio (AQA), free cash flow (AQD), asset turnover rate (AQE), SG&A costs (AQW), firm size (AQR), liabilities ratio (AQV), and operating cost ratio (AQN).
[b]Management can decide on unnecessary expenses that are sources of privilege consumption.

3.1.3 Firm Performance

This study uses ROA, EPS, ROE, and FPA to measure firm performance. Previous studies recognize that the effect of governance mechanisms on the performance of the firm will not reflect on the current period, leading to a lagged effect. We will therefore lag the current returns to the next period and observe for the true effect. We lag the ROA into the next period to ROA1, as well as the ROE into the next period to ROE1, as observed variables. Aside from these, because financial ratios are easily influenced by management manipulation, we further include RETURN as a variable to measure firm performance. Overall, we performed CFA on FPA, EPS, ROA, ROE, RETURN, lagged ROA (ROA1), and lagged ROE (ROE1) (Yen *et al.*, 2006). Table 3 shows the observable variables obtained from CFA and the definition of firm performance.

Table 3

Definition and Observable Variables of Firm Performance[a]

Construct	Observed Variables	Definition
FIN_PER	FPA	Interest cover = Earnings before interest and tax/current period interest expense
	EPS	Earnings per share = Past four seasons recurring income/ current period base plus weighted average stock number
	RETURN	stock returns [b]
	ROA	Ordinary income + interest expense * (1-25%))/average of total assets[c]
	ROE	Income after tax/total equity
	ROA1	Lagged one period of return on asset
	ROE1	Lagged one period of return on equity

[a]Firm performance observable variables include interest cover multiplier (FPA), earnings per share (EPS), return on stock price (RETURN), return on assets (ROA), return on equity (ROE), lagged ROA (ROA1), and lagged ROE (ROE1).

[b]$R_t = (P_t*(1+\alpha+\beta)+D)/(P_{t-1}+\alpha*C)-1)*100(\%)$ and $R_t = Ln(P_t*(1+\alpha+\beta)+D)/(P_{t-1}+\alpha*C))*100(\%)$, with P_t as the stock price in t period (index), α as purchase rate in the current period excluding rights, C as the cash price in the current period excluding rights, and D as cash dividend payments for the current period.

c Return on assets after tax before interest.

3.2. Sample Selection

We acquired data from the Taiwan Stock Exchange Corporation (TWSE) and the OTC registered firm GreTai Securities Market (GTSM) as samples in our study. The sampling period spans the years 2000 to 2006. Since OECD promulgated the corporate governance principle in 1999, many firms have slowly promoted the application of corporate governance. By using the year 2000 as a base point for our observation, we can examine for the effect of corporate governance on Taiwanese firms from the year 2000 to 2006. We excluded the financial industry and other industries that have insufficient data for our study; furthermore, we eliminated full-cash delivery stock firms. Data are collected from the *Taiwan Economic Journal* (TEJ), with 4,926 observable samples. Table 4 indicates the distribution of samples by year and by industry. It shows that majority of the samples belong to the electronics industry, with 59.97% of the

total, followed by the chemical industry (7.33%) and the electrical industry (6.33%).

Table 4

Distribution of Sampled Firms by Year and Industry

	2000	2001	2002	2003	2004	2005	2006	Total	Percentage
Cement	1	2	1	3	4	5	5	21	0.43%
Food	8	12	12	12	13	13	14	84	1.71%
Plastic	19	21	19	19	25	26	26	155	3.15%
Textiles	31	32	34	41	44	53	50	285	5.79%
Electrical	26	31	36	47	53	57	62	312	6.33%
Wires and Cables	9	7	8	10	10	12	10	66	1.34%
Chemicals	29	37	39	52	62	62	80	361	7.33%
Glass and Ceramics	5	4	4	5	4	6	7	35	0.71%
Paper manufacturing	4	4	4	5	7	7	6	37	0.75%
Iron and steel	16	17	18	17	16	23	28	135	2.74%
Rubber tyres	5	7	5	7	10	10	12	56	1.14%
Transporting equipment	3	4	3	3	3	3	4	23	0.47%
Information and electronics	136	186	293	445	535	651	708	2954	59.97%
Other industries	19	21	37	41	45	50	47	260	5.28%
Construction	3	4	3	5	4	2	5	26	0.53%
Transportation	3	4	4	2	3	6	5	27	0.55%
Tourism	4	2	4	6	7	10	10	43	0.87%
Merchandising	3	4	5	6	8	11	9	46	0.93%
Total	324	399	529	726	853	1007	1088	4926	100.00%
Percentage	6.58%	8.10%	10.74%	14.74%	17.32%	20.44%	22.09%	100.00 %	

4. Results

4.1. Descriptive Statistics and Data Transformation

Table 5 shows the descriptive statistics for each observable variable after performing CFA. We use a Winsorized method to deal with extreme values, with the interest cover multiplier having a larger deviation than the rest. After dealing with extreme values, the average manager's stockholding ratio is 2.1% and the average number of supervisors' seats is 2.664, while the average directors' and

supervisors' shareholding pledged shares ratio is 8.2%.[3] Data transformation is a

Table 5

Descriptive Statistics for Observable Variables

Variable	Mean	Standard Error	Min	25%	Median	75%	Max
Ownership Structure							
Managers' Stockholding Ratio	0.021	0.030	0.000	0.001	0.008	0.029	0.175
Ratio of Separation of Seats and Shares	0.268	0.237	-0.305	0.109	0.251	0.419	0.998
Family and Personal Stockholding Ratio	0.140	0.133	0.000	0.034	0.108	0.210	0.633
Composition of Directors and Supervisors							
Supervisors' Seats	2.664	0.651	1.000	2.000	3.000	3.000	8.000
Directors' and Supervisors' Stockholding Pledged Ratio	0.082	0.174	0.000	0.000	0.000	0.071	0.910
Directors' and Supervisors' Stockholding Ratio	0.244	0.125	0.515	0.153	0.219	0.313	0.664
Related Party Transactions							
Related Party Total Impo Ratio	0.186	0.282	0.000	0.000	0.030	0.270	0.990
Related Party's Revenue from Sales and Processin	0.143	0.194	0.000	0.005	0.060	0.207	0.877
Related Party's Revenue from Purchase and Outsourcing	0.189	0.275	0.000	0.000	0.045	0.258	0.972
Agency Cost							
Discretionary Expense Ratio	0.137	2.103	-0.420	0.039	0.068	0.110	6.894
Free Cash Flow Ratio	0.120	0.142	-0.621	0.038	0.104	0.188	1.360
Asset Turnover	0.932	0.620	0.003	0.541	0.777	1.144	5.559
Firm Performance							
Interest Cover Multiplier	490.716	2537	-147.38	1.74	11.65	51.76	20903.35
Earnings Per Share	1.494	2.638	-6.460	0.115	1.190	2.720	12.290
Lagged One Period on Return on Equity	0.046	0.793	-41.851	0.014	0.088	0.168	3.344

necessary step in structural equation modeling (SEM) analysis if the normal assumption is violated (Micerri, 1989). Chou *et al.* (1991) and Hu and Bentler

[3] Aside from the interest cover multiplier having a larger deviation, the Winsorized method deals with the initial 1% and the final 99% of the extreme values.

(1995) further point out that when a multi-normal assumption is found to be insignificant, bias will occur in the parameter estimation standard error and in the *t*-value of the SEM model, which will cause distortion in the significance of estimation results. Hence, to avoid non-positive definition technical problems in SEM analysis, we adopt Abarbanell and Bushee's (1998) method; we adjust the scale and unit of each observable variable in a common method. The raw data were arranged in deciles, leading to values of 1–10 for the transformed data. Since each latent variable is measured by multiple observable variables, and due to the fact that the expected effect of each observable variable on each latent variable is not the same, when an observable variable has a negative effect on a latent variable, the variable is arranged in an opposite direction in order to account for consistency in the expected direction for the latent variable.[4]

4.2. Direct Effect

A CFA analysis was first performed to measure the fundamental part of the SEM model before testing for the direct effects of latent variables. The main purpose was to test for the hypothesized relationships between variables and latent variables; CFA can also be applied independently when assessing reliability or validity, as well as when testing for the effectiveness of theories (Bentler, 1989).

We first performed CFA on the observable variables of corporate governance, agency costs, and firm performance latent variables, and we deleted the inefficient observable variables in order to adapt to the different measures of each factor. After deleting for inefficient variables, the CFA results for ownership structure (SH_COM) of corporate governance (COR_GOV) include managers' stockholding ratio (SHA), family and personal stockholding ratio (SHB), and ratio of separation of seats and shares (SHK).

As for the CFA results for the composition of directors and supervisors, the final construct includes the variables supervisors' seats (DRC), directors' and

[4] Only the three related party transaction variables in this study (related party total import ratio, related party's revenue from sales and processing, and related party's revenue from purchase and outsourcing) are arranged in reverse order.

supervisors' stockholding ratio (DRD), and directors' and supervisors' stockholding pledged ratio (DRG). The CFA results for related party transactions show that the final included variables are related party's total import ratio (PAB), related party's revenue from sales and processing (PAE), and related party's revenue from purchase and outsourcing (PAF).

The CFA results for agency costs (AGE_COS) include the variables discretionary expense ratio (AQA), free cash flow (AQD), and asset turnover (AQE). The firm performance CFA results indicate that interest cover multiplier (FPA), earnings per share (EPS), and lagged one period on return on equity (ROE1) are included. To measure for the model fit and assist in examining the direct and indirect effects, we attempted to find the optimal fit index to conform to each variable.

Using the CFA results, we proceeded with two tests for examining direct effects. Figure 2 shows the direct effect of corporate governance influence on agency costs; this tested whether the corporate governance of Taiwanese firms can effectively control for agency costs problems, which shows the maladministration-mitigating function of corporate governance. The results indicate that corporate governance (COR_GOV) has a negative significant correlation with agency costs (AGE_COS) (coefficient = –0.68, *t*-value = –3.55), which implies that a maladministration-mitigating function for corporate governance exists in Taiwanese firms.

Table 6 is the evaluation chart for the direct effect of corporate governance on agency costs. If the chi-square value indicator is not significant, then a good fit is indicated between the model and the sample; however, since its significance is easily affected by the number of samples, we proceeded with the absolute, comparative, and parsimonious model fit tests. There were 12 tests for the model fit (see Appendix 1 for the formula). Amongst all of the fit measures, aside from the comparative measures of fit, which were below the acceptable standards, the absolute and parsimonious fits all achieved values above the standards.

Figure 3 and Table 7 show the direct effect of corporate governance influence on firm performance. Figure 3 shows the positive significant correlation between corporate governance and firm performance (coefficient = 0.10, *t*-value =

6.21). Aside from the chi-square value, which is easily influenced by the number of samples, Table 7 shows that the comparative fit index values are close to standards, and the other indices have all achieved accepted standards, which indicates that corporate governance has a beneficial function.

Figure 2

The Direct Effect of Corporate Governance Influence on Agency Costs

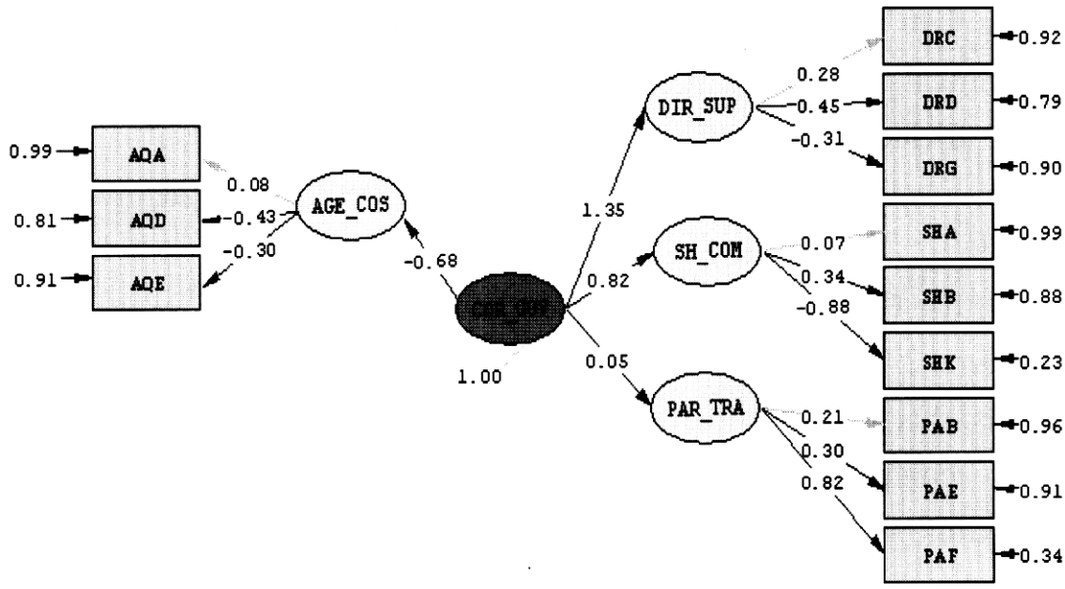


Figure 3

The Direct Effect of Corporate Governance Influence on Firm Performance

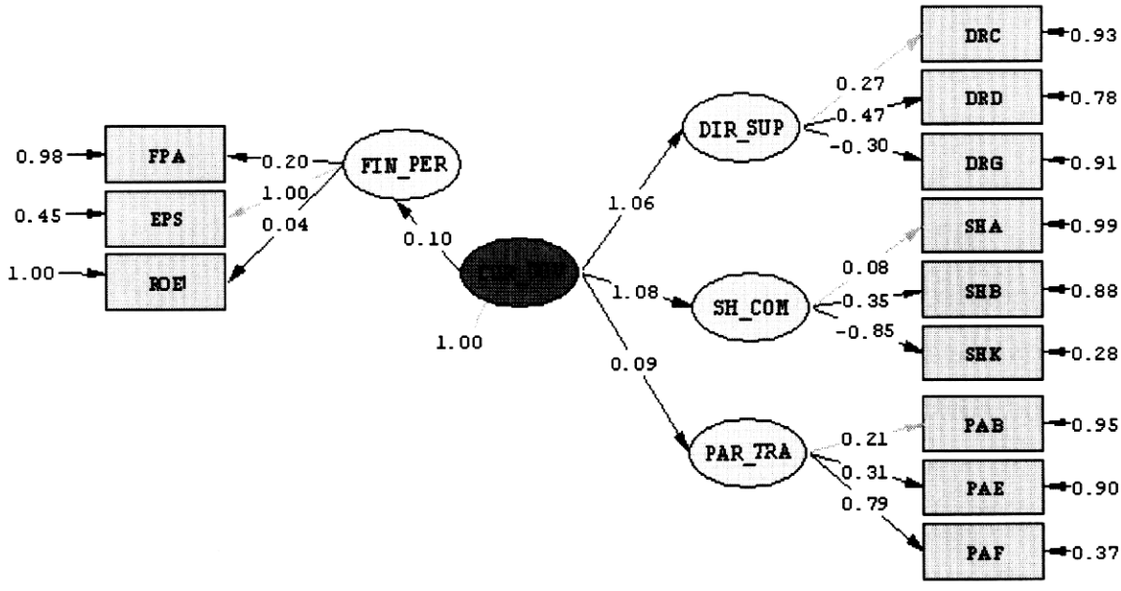


Table 6

Evaluation Chart for the Direct Effect of Corporate Governance influence on Agency Costs

	Evaluation Content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant, indicating a good model fit	845.84 (P = 0.00)
	GFI ≥ 0.90	0.97
	AGFI ≥ 0.90	0.96
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.045
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0.10 (poor fit)	0.054
Overall model fit – comparative fit index	NFI ≥ 0.90	0.83
	NNFI ≥ 0.90	0.78
	IFI ≥ 0.90	0.84
	CFI ≥ 0.90	0.84
	RFI ≥ 0.90	0.77
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.63
	PGFI ≥ 0.5	0.62
	CN > 200	444.34

4.3. The Mediating Effect of Agency Costs

Figure 4 shows the mediating effect of agency costs on the influence of corporate governance on firm performance. The figure indicates that with the inclusion of the mediating effect of agency costs, the influence of corporate

governance on agency costs and of agency costs on firm performance have shown negative significant correlations (with coefficients of –0.37 and –0.77 and *t*-values of –2.91 and –2.82, respectively).

Table 7

Evaluation Chart for the Direct Effect of Corporate Governance Influence on Firm Performance

	Evaluation Content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant, indicating a good model fit	482.00 (P = 0.00)
	GFI ≥ 0.90	0.98
	AGFI ≥ 0.90	0.97
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.032
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0.10 (poor fit)	0.042
Overall model fit – comparative fit index	NFI ≥ 0.90	0.87
	NNFI ≥ 0.90	0.85
	IFI ≥ 0.90	0.89
	CFI ≥ 0.90	0.89
	RFI ≥ 0.90	0.83
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.66
	PGFI ≥ 0.5	0.63
	CN > 200	779.56

Figure 4

The Mediating Effect of Agency Costs on the Influence of Corporate Governance on Firm Performance

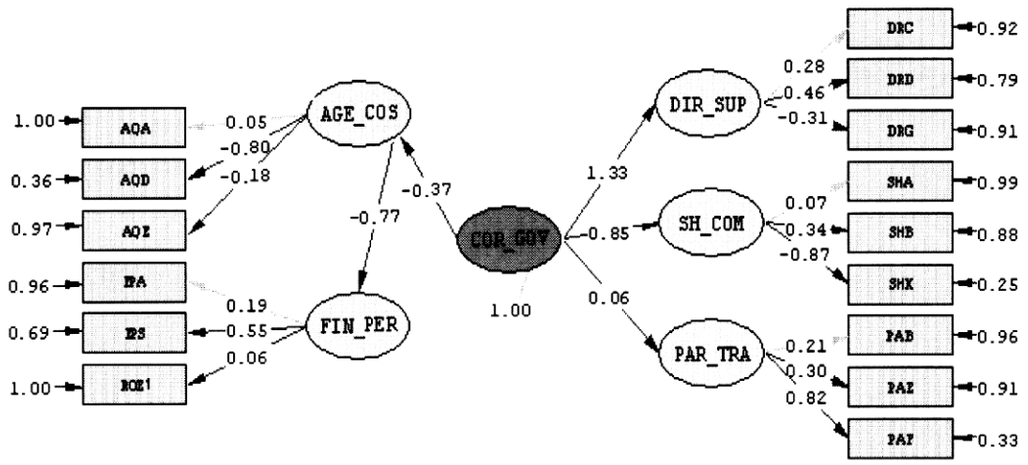


Table 8 is the evaluation chart for the mediating effect of agency costs on the influence of corporate governance on firm performance. The model fit indicates that aside from the chi-square value significance, which is easily influenced by the number of samples, the comparative fit index is below standards, while the other fit indices have all reached acceptable standards.

Table 9 shows the direct effect and the mediating effect among corporate governance, agency costs, and firm performance. The chart indicates that after including the mediating effect of agency costs, corporate governance still has a positive significant correlation with firm performance (coefficient = –0.37* (–0.77) = 0.2849, *t*-value = 6.95) as compared to the mediating effect of uncontrolled agency costs (coefficient = 0.10) on firm performance.

Since the direct effect of corporate governance on firm performance is not significant, agency costs have only a partial mediating effect on the influence of corporate governance on firm performance. The above results indicate that corporate governance can increase performance through direct positive influence on firm performance and through decreasing agency costs. The results show that Taiwanese firms' corporate governance has both beneficial and maladministration-mitigating functions. These provide evidence that in

investigating the influence of corporate governance on firm performance, the mediating role of agency costs must be included. This is consistent with the hypothesis that this study has proposed.

Table 8

Evaluation Chart for the Mediating Effect of Agency Costs on the Influence of Corporate Governance on Firm Performance

	Evaluation Content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant, indicating a good model fit	990.61(P = 0.00)
	GFI ≥ 0.90	0.97
	AGFI ≥ 0.90	0.96
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.040
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0.10 (poor fit)	0.047
Overall model fit –comparative fit index	NFI ≥ 0.90	0.83
	NNFI ≥ 0.90	0.81
	IFI ≥ 0.90	0.84
	CFI ≥ 0.90	0.84
	RFI ≥ 0.90	0.79
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.67
	PGFI ≥ 0.5	0.69
	CN > 200	589.46

4.4. Equity Structure, Composition of Directors and Supervisor, and Related Party Transactions

In this study, corporate governance is made up of three latent variables: ownership structure, composition of directors and supervisors, and related party transactions. Since previous studies found both positive and negative effects among these three variables, we investigated their effects on agency costs separately. The purpose of this is to avoid the offsetting of positive and negative effects from each latent variable, since ownership structure, composition of directors and supervisors, and related party trading have different effects on corporate governance.

Figure 5 shows the mediating effect of agency costs on the influence of the composition of directors and supervisors on firm performance. After controlling for the effect of agency cost, the composition of directors and supervisors has increased firm performance (coefficient –0.5*(–0.79) = 0.395, *t*-value = 6.85). Table 10 is the evaluation chart for the mediating effect of agency costs on the influence of the composition of directors and supervisors on firm performance. The results show that aside from the easily influenced chi-square values, two comparative fit measures are below standards, while the other fit measures showed an acceptable fit.

Figure 6 shows the mediating effect of agency costs on the influence of equity structure on firm performance, after controlling for the effect of agency costs, ownership structure has helped increase firm performance (coefficient -0.24 * (–0.78) = 0.1872, *t*-value = 5.07). Table 11 is the evaluation chart for the mediating effect of agency costs on the influence of equity structure on firm performance. The results show that aside from the easily influenced chi-square value, the comparative fit index measures are all below standards, while the other fit measures show acceptable standard values.

Table 9

The Direct and Mediating Effects among Corporate Governance, Agency Costs, and Firm Performance

	Direct Effect	*t*-value	Mediating Effect[1]	*t*-value[2]
Corporate governance on firm performance	0.10	6.21***	—	—
Corporate governance on agency costs	-0.68	-3.55***	—	—
Corporate governance on agency costs	-0.37	-2.91***	0.2849	6.95***
Agency costs on firm performance	-0.77	-2.82***	—	—

Mediating effect is calculated as (-0.37 * (-0.77) = 0.2849)
*** Indicates that a 1% significance is achieved

Figure 5

The Mediating Effect of Agency Costs on the Influence of the Composition of Directors and Supervisors on Firm Performance

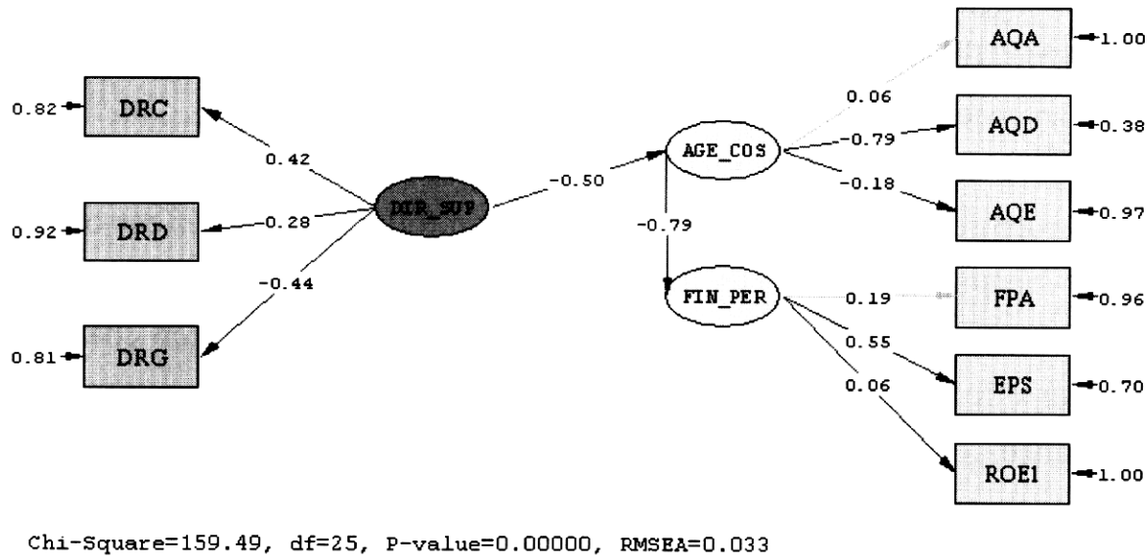


Table 10

Evaluation Chart for the Mediating Effect of Agency Costs on the Influence of the Composition of Directors and Supervisors on Firm Performance

	Evaluation content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant ,indicating a good model fit	159.49(P = 0.00)
	GFI ≥ 0.90	0.99
	AGFI ≥ 0.90	0.99
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.026
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0.10 (poor fit)	0.033
Overall model fit – comparative fit index	NFI ≥ 0.90	0.91
	NNFI ≥ 0.90	0.89
	IFI ≥ 0.90	0.93
	CFI ≥ 0.90	0.92
	RFI ≥ 0.90	0.87
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.63
	PGFI ≥ 0.5	0.55
	CN > 200	1380.63

Figure 6
The Mediating Effect of Agency Costs on the Influence of Equity Structure on Firm Performance

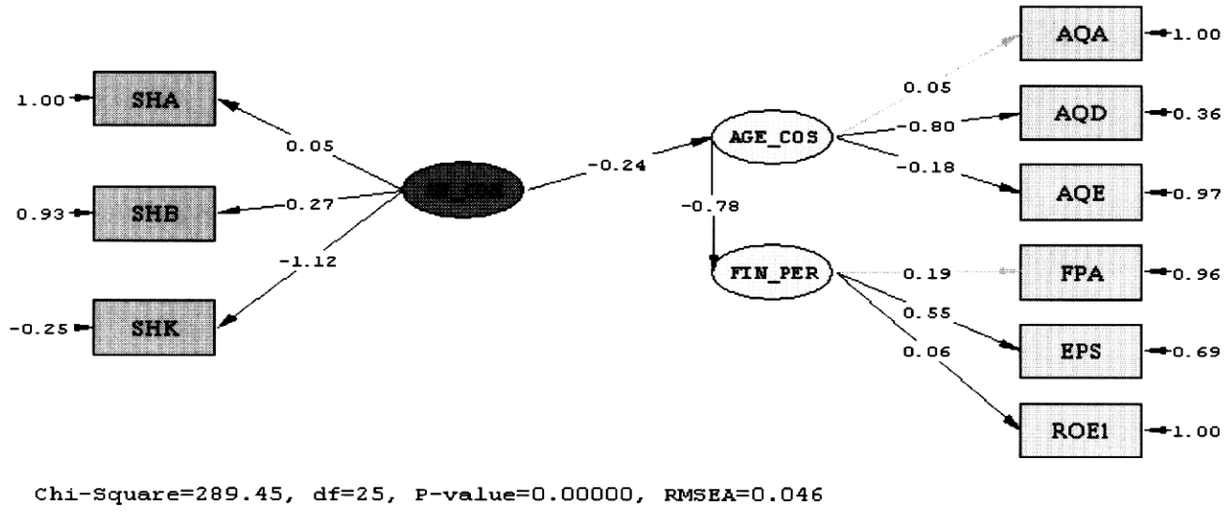


Figure 7 shows the mediating effect of agency costs on the influence of related party transactions on firm performance. Related party transactions has a positive but insignificant relationship with agency costs (coefficient = 0.01, *t*-value = 0.61); thus, agency costs has no mediating effect on the influence of related party transactions on firm performance. Table 12 is the evaluation chart for the mediating effect of agency costs on the influence of related party transactions on firm performance. The results show that aside from the easily influenced chi-square value, three comparative fit measures are below standards, while the other fit measures were able to reach an acceptable standard fit.

The above results indicate that the composition of directors and supervisors has the highest coefficient (0.395), higher than the overall corporate governance coefficient value (0.2849), while the ownership structure coefficient is a bit low (0.1872), but is still positive and significant. Although we find that related party transactions through agency costs has a negative effect on firm performance, the effect is not significant; thus, the mediated relationship among the three variables does not exist Nevertheless, we find that related party transactions will reduce firm performance and are positively correlated with agency costs. From the results of this study, we find that both beneficial and maladministration-mitigating

functions of corporate governance commonly exist for Taiwanese firms, and that there is no large counter-effect in the measurement of corporate governance.

Table 11
Evaluation Chart for the Mediating Effect of Agency Costs on the Influence of Equity Structure on Firm Performance

	Evaluation content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant, indicating a good model fit	289.45(P = 0.00)
	GFI ≥ 0.90	0.99
	AGFI ≥ 0.90	0.98
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.035
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit) > 0.10 (poor fit)	0.046
Overall model fit – comparative fit index	NFI ≥ 0.90	0.85
	NNFI ≥ 0.90	0.80
	IFI ≥ 0.90	0.86
	CFI ≥ 0.90	0.86
	RFI ≥ 0.90	0.78
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.59
	PGFI ≥ 0.5	0.55
	CN > 200	748.09

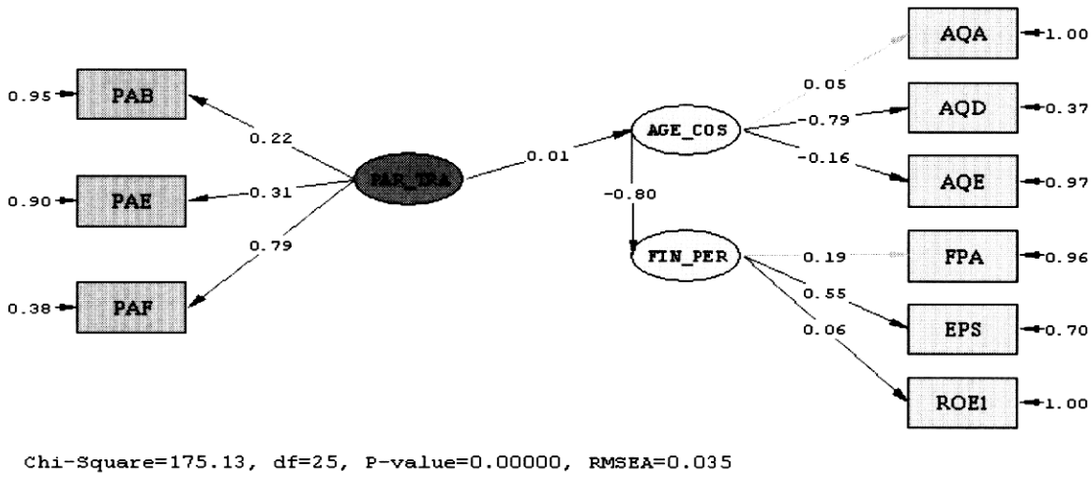
4.5. Sensitivity Analysis

This study has investigated the direct effects of corporate governance on firm performance and of corporate governance on agency costs, as well as the

mediating effect of agency costs on the influence of corporate governance on firm performance. However, because the LISREL analysis is unable to test for non-continuous variables, we cannot control for the deviation effects caused by industry and year differences.

Figure 7

The Mediating Effect of Agency Costs on the Influence of Related Party Transactions on Firm Performance



Previous studies suggest that the electronics industry puts more emphasis on developing corporate governance and its outcomes; thus, in this study we segregated samples by separating them into electronics and non-electronics industries before we proceeded with analysis. The Sarbanes Oxley Act, established due to the Enron case in 2002, has vastly affected firms and investors; thus, we further separate the samples into two sections. The purpose of the separation of samples is to examine whether the outcomes of corporate governance have improved or affected many firms, and to see whether the implementation of the Sarbanes Oxley Act has helped in containing agency costs and in improving firm performance.

Results indicate that the corporate governance of the electronics industry can effectively increase firm performance (coefficient = 0.28, *t*-value = 3.25); however, corporate governance and agency costs have a positive but insignificant

Table 12

Evaluation Chart for the Mediating effect of Agency Costs on the Influence of Related Party Transactions on Firm Performance

	Evaluation content	Results
Overall model fit – absolute fit index	Chi-square value is insignificant indicating a good model fit	175.13(P = 0.00)
	GFI ≥ 0.90	0.99
	AGFI ≥ 0.90	0.99
	SRMR < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0 .10 (poor fit)	0.028
	RMSEA < 0.05 (excellent fit); 0.05 ~ 0.08 (good fit); 0.08 ~ 0.10 (moderate fit); > 0.10 (poor fit)	0.035
Overall model fit – comparative fit index	NFI ≥ 0.90	0.88
	NNFI ≥ 0.90	0.85
	IFI ≥ 0.90	0.90
	CFI ≥ 0.90	0.90
	RFI ≥ 0.90	0.83
Overall model fit – parsimonious fit index	PNFI ≥ 0.5	0.61
	PGFI ≥ 0.5	0.55
	CN > 200	1233.86

correlation (coefficient = 0.89, *t*-value = 1.23).[5] The corporate governance of non-electronics firms can also increase firm performance (coefficient = 0.05, *t*-value = 2.96); however, the coefficient is smaller as compared to that of the

[5] When the coefficient for the influence of corporate governance on firm performance and the coefficient for the influence of corporate governance on agency costs are significant at the same time, the mediating effect of agency costs on the influence of corporate governance on firm performance is established. Therefore, a mediating effect test need not be carried out.

electronics industry, with a coefficient of 0.28. The effect of corporate governance on agency costs cannot be contained, which implies that firms within the electronics industry have better corporate governance than non-electronics firms. Between 2000 and 2002, the samples show that corporate governance and firm performance have a positive but insignificant correlation (correlation = 0.28, *t*-value = 1.91), and the effect of corporate governance on agency costs cannot be contained. After 2002, results indicate that there is a positive and significant correlation (coefficient = 0.26, *t*-value = 2.37) between corporate governance and firm performance, corporate governance has a negative and significant correlation with agency costs (coefficient = -0.67, *t*-value = -3.56), and the mediating effect of agency costs on the influence of corporate governance on firm performance signifies that corporate governance can first weaken agency costs and then improve firm performance (-0.34 * (-0.80) = 0.272). These results indicate that between 2003 and 2006, the effective role of corporate governance came fully into play, thereby improving both the beneficial and maladministration-mitigating functions of corporate governance.

5. Conclusions

This study has investigated the beneficial and maladministration-mitigating roles of corporate governance. We have attempted to include the mediating effect of agency costs in our analysis of the effect of corporate governance on firm performance. First, we tested for the direct effect of corporate governance on firm performance (beneficial role) and the direct effect of corporate governance on agency costs (maladministration-mitigating role). Then, we set out to prove the mediating effect of agency costs in the influence of corporate governance on firm performance and examined whether these two functions can together improve firm performance.

In the examination of direct effects, the empirical results show that corporate governance and firm performance are positively and significantly correlated, whereas corporate governance and agency costs are negatively and significantly correlated. The results for the mediating role of agency costs indicate

that corporate governance can first control for agency costs in a firm and then help improve firm performance. This is consistent with the expectations of our study.

With the inclusion of agency costs as a mediating variable, corporate governance can control for agency costs and can increase firm performance. This indicates that reducing agency costs is an important way for the corporate governance of Taiwanese firms to increase firm performance, thus supporting the hypothesis proposed in this study. Due to the inclusion of agency costs as a mediating variable, the influence of corporate governance on agency costs and the influence of agency costs on firm performance are significant. Therefore, agency costs only has a partial mediating effect in the influence of corporate governance on firm performance, implying that the corporate governance of Taiwanese firms has both beneficial and maladministration-mitigating functions.

The main contribution of this paper lies in clarifying the ambiguity concerning the relationship between corporate governance and firm performance; for this purpose, agency costs are included as a mediator and the LISREL analysis was used. We believe that when the mediating effect is large, it can easily lead to an inability to determine whether the functions of corporate governance are effectively manifested or not. Only with the inclusion of testing and the determination of a mediating variable will the relationships between variables be apparent. By relying on a mediating variable, the beneficial and maladministration-mitigating functions of corporate governance can increase the strength of firm performance.

The major limitation of this study is that LISREL is unable to analyze discontinuous variables; hence, we cannot set dummy variables in order to view a clearer relationship between the variables in the study. Although we segregated samples before proceeding with the analysis, we could not test for all samples and control for industry and year effects at the same time. Future research could move further in this direction and find a framework for further analysis.

6. References

Abarbanell, J. S. and Bushee, B. J. (1998), "Abnormal Returns to A Fundamental Analysis Strategy," *Journal of Accounting Research*, 73(1), 19-45.

Agrawal, A. and Knoeber, C. R. (1996), "Firm Performance and Mechanism to Control Agency Problems between Managers and Shareholders," *Journal of Financial and Quantitative Analysis*, 31(3), 377-397.

Ang, J. S., Cole, R. A., and Lin, J. W. (2000), "Agency Costs and Ownership Structure," *Journal of Finance*, 55(1), 81-106.

Balatbat, M., Taylor, S., and Walter, T. (2004), "Corporate Governance, Insider Ownership and Operating Performance of Australian Initial Offerings," *Accounting & Finance*, 44(3), 299-329.

Baron, R. M. and Kenny, D. A. (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic and Statistical Considerations," *Journal of Personality and Social Psychology*, 51(6), 1173-1182.

Bentler, P. M. (1989), *EQS Structural Equations Program Manual,* Los Angeles, CA: BMDP.

Bentler, P. M. (1990), "Comparative Fit Indexes in Structural Model," *Psychological Bulletin*, 107(2), 238-246.

Bentler, P. M. and Bonett, D. G. (1980), "Significance Tests and Goodness of Fit in the Analysis of Covariance Structures," *Psychological Bulletin*, 88(3), 588-606.

Berle, A. and Means, G. (1932), *The Modern Corporation and Private Property,* New York, NY: MacMillan.

Bhagat, S. and Black, B. (2002), "The Non-correlation between Board Independence and Long-term Firm Performance," *Journal of Corporation Law*, 27(2), 231-274.

Bhagat, S. and Jefferris, R. (2002), *The Econometrics of Corporate Governance Studies*, Boston, MA: MIT Press.

Black, B. S., Jang, H., Kim, W., and Mark, J. (2006), "Does Corporate Governance Affect Firm Value? Evidence from Korea," *Journal of Law,*

Economics and Organization, 22(2), 366-413.

Bollen, K. A. (1989), "Sample Size and Bentler and Bonett's Nonnormed Fit Index," *Psychometrika,* 51(3), 375-377.

Cadbury, A. (1999), "What are the Trends in Corporate Governance? How Will They Impact Your Company?" *Long Range Planning,* 32(1), 12-19.

Chen, L. C. (2004), "The Empirical Analysis of Relationship between Composition of Board of Directors, Ownership Structure, the Related Party Transaction and Firm Performance - Evidence in Textile Industry and Electronics Industry Listed on TSE," Master's thesis, National Cheng Kung University.

Chen, R. S. (2004), "Corporate Governance - Shareholders Interest and Shareholders Protection," Doctorate thesis, National Chung Cheng University.

Chiang, C. S. (2004), "The Impacts of Business Strategies and Compensation Strategy on Organizational Performance," Master's thesis, Soochow University.

Chou, C. P., Bentler, P. M., and Satorra, A. (1991), "Scaled Test Statistics and Robust Standard Errors for Non-normal Data in Covariance Structure Analysis: A Monte Carlo Study," *British Journal on Mathematical and Statistical Psychology*, 44(2), 347-357.

Conyon, M. J. and Peck, S. I. (1998), "Board Size and Corporate Performance: Evidence from European Countries," *European Journal of Finance*, 4(3), 291-304.

Cubbin, J. and Leech, D. (1983), "The Effect of Shareholding Dispersion on the Degree of Control in British Companies: Theory and Measurement," *The Economic Journal*, 93(4), 351-369.

Demsetz, H. and Villalonga, B. (2001), "Ownership Structure and Corporate Performance," *Journal of Corporate Finance*, 7(3), 209-233.

Dobrzynski, J. H. (1993), "Corporate Boards may Finally be Shaping Up," *Business Week,* 31, 26.

Eisenberg, T., Sundgren, S., and Wells, M. T. (1998), "Larger Board Size and Decreasing Firm Value in Small Firms," *Journal of Financial Economics*,

48(1), 35-54.

Fama, E. (1980), "Agency Problems and the Theory of the Firm," *Journal of Political Economics,* 88(2), 288-308.

Fama, E. and Jensen, M. C. (1983), "Separation of Ownership and Control," *Journal of Law & Economics,* 26(2), 301-325.

Gillies, J. and Leblanc, R. (2003), "The Coming Revolution in Corporate Governance," *Ivey Business Journal,* 68(1), 1-11.

Gompers, P., Ishii, J., and Metrick, A. (2003), "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics,* 118(1), 107-156.

Hoelter, J. W. (1983), "The Analysis of Covariance Structures: Goodness-of-Fit Indices," *Sociological Method and Research,* 11(3), 325-344.

Hu, L. T. and Bentler, P. M. (1995), *Evaluating Model Fit*, In R.H. Hoyle (Ed.), *Structural Equation Modeling*, Thousand Oaks, CA: Sage.

James, L. R., Mulaik, S. A., and Brett, J. M. (1982), *Casual Analysis: Assumptions, Models, and Data*, Beverly Hills, CA: Sage.

Jensen, M. C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," *American Economic Review*, 76(2), 323-329.

Jensen, M. C. and Meckling, W. H. (1976), "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics,* 3(4), 305-360.

Jensen, M. C. and Ruback, R. (1983), "The Market of Corporate Control," *Journal of Financial Economics,* 11(1), 5–50.

Joreskog, K. G. and Sorbom, D. (1993), *Structural Equation Modeling with the SIMPLIS Command Language*, Chicago: Scientific Software International.

Kim, B. and Lee, I. (2003), "Agency Problems and Performance of Korean Companies during the Asian Financial Crisis: Chaebol vs. Non–chaebol Firms," *Pacific-Basin Finance Journal,* 11(3), 327–348.

La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (1999), "Corporate Ownership around the World," *Journal of Finance*, 54(2), 471-517.

Marsh, H. W. and Hocevar, D. (1985), "The Application of Confirmatory Factor Analysis to the Study of Self-concept: First and Higher Order Factor Structures and their Invariance Across Age Groups," *Psychological Bulletin,*

97(3), 562-582.

Marsh, H. W., Balla, J. R., and McDonald, R. P. (1988), "Goodness-of-Fit Indexes in Confirmatory Factor Analysis: The Effect of Sample Size," *Psychological Bulletin*, 103(3), 391-410.

Mehran, H. (1995), "Executive Compensation Structure, Ownership, and Firm Performance," *Journal of Financial Economics*, 38(2), 163-184.

Micceri, T. (1989), "The Unicorn, the Normal Curve and Other Improbable Creatures," *Psychological Bulletin*, 105(1), 156-165.

Morck R., Shleifer, A., and Vishny, R. W. (1988), "Management Ownership and Market Valuation: An Empirical Analysis," *Journal of Financial Economics,* 20(1), 293-315.

Myers, S. C. (2001), "Capital Structure," *Journal of Economic Perspectives*, 15(2), 81-102.

Pearce, J. A. and Zahra, S. A. (1992), "Board Composition from a Strategic Contingency Perspective," *Journal of Management Studies,* 29(4), 53-58.

Shiue, M. J., Huang, C. J., and Chang, Y. S. (2007), "Corporate Governance and Firm Performance: The Mediating Role of Earnings Management," 2007 Annual Conference of the Taiwan Finance Association.

Singh, M. and Davidson III, W. N. (2003), "Agency Cost, Ownership Structure and Corporate Governance Mechanism," *Journal of Banking and Finance,* 27(5), 793-816.

Steiger, J. H. (1990), "Structural Model Evaluation and Modification: An Interval Estimation Approach," *Multivariate Behavioral Research*, 25(2), 173-180.

Steiner, T. L. (1996), "A Reexamination of the Relationships between Ownership Structure, Firm Diversification, and Tobin's Q," *Quarterly Journal of Business and Economics*, 35(4), 39-48.

Warfield, T. D., Wild, J. J., and Wild, K. L. (1995), "Managerial Ownership, Accounting Choice, and Informativeness of Earnings," *Journal of Accounting & Economics*, 20(1), 61-91.

Wu, M. Y. (2004), "The Association among the Reward of the Executive Management Officers, Research & Development Expenditure, Ownership Structure, and the Corporate Value," Master's thesis, Tamkang University.

Yafeh, Y. and Yosha, O. (2003), "Large Shareholders and Banks: Who Monitors and How?" *The Economic Journal,* 113(484), 128-146.

Yeh, Y. H., Lee, T. S., and Ko, C. E. (2002a), *Corporate Governance and Rating System*, Taipei, Taiwan: Sunbrieht Publishing Co. (in Chinese).

Yeh, Y. H., Lee, T. S., and Ko, C. E. (2002b), "The Effect of Corporate Governance on the Related–party Transaction," 2002 Conference of Taiwan Finance Association.

Yen, C. C., Chao, C. L., and Chang, Y. S. (2006), "An Empirical Investigation of the Association among Corporate Governance, Earnings Management, and Business Performance," *Journal of Kaohsiung University of Applied Sciences*, 35(3), 281-308.

Yermack, D. (1996), "Higher Market Valuation for Firms with a Small Board of Directors," *Journal of Financial Economics*, 40(2), 185-211.

Appendix I

We adopted Chou's (2006) measurement standards, which are absolute fit measures, comparative fit measures, and parsimonious fit measures.

Measurement Standard	Description	Measurement Formula
Absolute Fit Measures		
1. Chi-square test value (χ^2)	Describes the degree of fit between the theoretical model and the observed model; the value must reach statistical significance. The chi-square test is sensitive to the number of samples, and is easily rejected. As the sample size increases, it is easier for χ^2 to be significant, making most models easily rejected; therefore, other measures are needed for a comprehensive assessment. (Bentler and Bonett 1980; Marsh and Hocevar 1985)	
2.Goodness-of-Fit Index (GFI)	GFI is based on the square of the deviation of observable variables; the index should be equal to or greater than 0.90. The GFI describes the ratio between the variance and covariance of the explainable observable data in the hypothesized model.	$GFI = \frac{tr(\hat{\sigma}' W \hat{\sigma})}{tr(s' W s)}$ With the numerator calculated as the weighted covariance sum from the variance of the hypothesized model. The denominator is the weighted average sum of the covariance obtained from actual observed variables. W is the weighted matrix.

3.Adjusted Goodness-of-Fit Index (AGFI)	AGFI further adjusts the degrees of freedom for the GFI model; if the index is equal to or greater than 0.90, a good fit is achieved. The AGFI is similar to the adjusted R^2 in regression analysis. In calculating the model degree of fit, the degree of freedom is taken into consideration; the more parameters there are in the model, the higher the fit will be.	$AGFI = 1 - \frac{1 - GFI}{1 - \frac{number\ of\ estimated\ parameters}{number\ of\ observed\ data}}$
4.Standardized Root Mean Square Residual (SRMR)	The simplest fit index provided by LISREL is RMSR, while SRMSR is the standardized RMSR.	
5.Root Mean Square Error of Approximation (RMSEA)	This index was developed by Steiger (1990) and is based on residual analysis results evaluation. The smaller the value, the more it represents a good fit between the model and the data. The RMSEA coefficient is not influenced by sample size and model complexity.	$estimated\_RMSAEA = \sqrt{\frac{\hat{F}_0}{df_{test}}}$ With $\hat{F}_0 = \frac{\chi^2_{test} - df_{test}}{N}$, χ^2_{test} as the chi–square test value, df_{test} as the degrees of freedom, and N as the sample number.
Comparative Fit Measures		
1. Normed Fit Index (NFI)	Bentler and Bonett (1980) recommend that NFI value be equal to or greater than 0.90 to achieve a good fit. The principle behind this is calculating the deviation between the chi-square value (χ^2_{test}) and the independent model chi-square value (χ^2_{indep}).	$NFI = \frac{\chi^2_{indep} - \chi^2_{teat}}{\chi^2_{indep}}$

2. Non-Normed Fit Index (NNFI)	The logic behind NNFI and NFI is similar: a value equal to or greater than 0.90 represents a good fit. When the sample size is small and when the degree of freedom is large, using NFI to test for fit will result in underestimation. Therefore, this index takes into consideration the effect of degree of freedom in order to avoid the effects of model complexity.	$NNFI = \frac{\chi^2_{indep} - \frac{df_{indep}}{df_{test}} \cdot \chi^2_{test}}{\chi^2_{indep} - df_{indep}}$
3. Incremental Fit Index (IFI)	Bollen (1989) reintroduced scale factors to the IFI; a value equal to or greater than 0.90 represents a good fit for the IFI. The IFI coefficient aims at the volatility and sample size problems of NNFI, and it corrects the effects brought about by these problems.	$IFI = \frac{\chi^2_{indep} - \chi^2_{test}}{\chi^2_{indep} - df_{test}}$
4. Comparative Fit Index (CFI)	Bentler (1990) uses a non-centralized chi-square distribution CFI; a value equal to or greater than 0.90 represents a good fit. CFI describes the degree of improvement between the model and the independent model. The CFI is most suitable for data with a small sample size.	$CFI = 1 - [\frac{\chi^2_{mod\ el} - df_{mod\ el}}{\chi^2_{indep} - df_{indep}}]$
5. Relative Fit Index (RFI)	$RFI = \frac{(\chi^2_{indep} - \chi^2_{mod\ el}) - [df_{indep} - (\frac{df_{mod\ el}}{n})]}{\chi^2_{indep} - (\frac{df_{indep}}{n})}$ Marsh *et al.* (1988) proposed the RFI, with values equal to or greater than 0.90 representing a good fit.	

Parsimonious Fit Measures		
1. Parsimonious Normed Fit Index (PNFI)	James *et al.* (1982), in an effort to simplify models, proposed an NFI-based corrected index. PNFI values equal to or greater than 0.50 represent a good fit.	$PNFI = (\frac{df_{model}}{df_{indep}})NFI$
2. Parsimonious Goodness-of-Fit Index (PGFI)	The PGFI is another form of the GFI; values should be equal to or greater than 0.50. PGFI takes into consideration the number of estimated parameters in the model; it can be used to reflect the degree of parsimony in the hypothesized model in SEM (degree of parsimony).	$PGFI = [1-(\frac{Number \text{ of estimated paramters in model}}{Number \text{ of observatio ns}})]GFI$
3. Hoelter's Critical N (CN)	The CN value describes the appropriateness of the sample scale; its principle is based on estimating the necessary sample size in calculating a suitable model fit. Hoelter (1983) states that a CN value bigger than 200 represents that the model can suitably reflect sample data.	