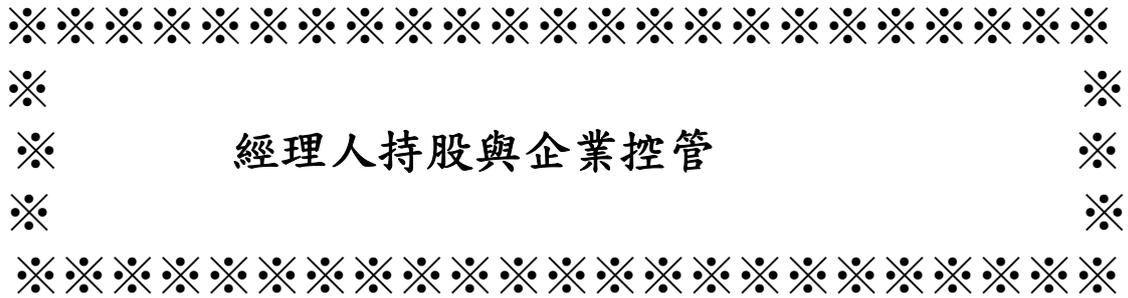


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執行單位：淡江大學產業經濟學系

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經理人持股與企業控管

Managerial Ownership and Corporate Governance

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Group Affiliation, Identity of Managers, and the Relation between Managerial Ownership and Performance

1. Introduction

Agency theory argues that modern corporations characterized by highly diffused ownership are subject to conflicts arising from the separation of ownership and control. Because complete and contingent contracts are infeasible, managers end up with effective control rights in the use of firm resources. They tend to consume excessive perquisites and engage in opportunistic behavior at shareholders' expenses. The agency costs can be mitigated by granting managers share ownership to align their interests with those of other shareholders. Managerial holdings serve as a credible guarantee of bearing the cost of not maximizing the value of shares.

Based on the agency theory, a large number of studies have been made on the relation between managerial ownership and firm performance, for example, Demsetz and Lehn (1985), Morck et al. (1988), McConnell and Servaes (1990), Agrawal and Knoeber (1996), Chung and Pruitt (1996), Loderer and Martin (1997), Chen and Steiner (1999), and Himmelberg et al. (1999). However, as Demsetz and Villalonga (2001) pointed out, because these studies differ in the measurements of firm performance and managerial ownership, and in whether and how the endogeneity of managerial ownership is taken into account in the estimation of the effect of ownership on performance, there is little agreement as to how managerial holdings affect firm performance. They conclude that viewed in totality, these studies cannot reject the belief that firm performance and managerial ownership are unrelated. This paper adds to the literature by investigating the managerial ownership in Taiwan. Two distinctive features in Taiwan's corporate structures complicate the relation between managerial ownership and performance and raise several questions that are rarely considered in the US based studies.

The first feature is that Taiwan is a country whose economies are dominated by family-controlled conglomerates. A large portion of listed companies is affiliated with business groups. Managerial ownership is a means through which families can obtain control over affiliated firms. Stock pyramids and cross-ownership, which are widely observed among group members, suggest that managerial holdings in group firms may reflect the nature of an entrepreneur-run corporate sector more than a corporate governance problem. The second feature is that there are two types of managers, one the individual managers and the other the representatives appointed by institutions that hold a substantial percentage of shares to take board or top management positions. Differences in the motivations and effects between holdings of individual and institutional managers were emphasized by Holderness and Sheehan (1988), but little attention has so far been given to this point in the literature.

Several questions connecting the ownership-performance relation with group affiliation and managerial identity then arise. Does the effect of managerial holdings on firm performance for Taiwan's companies differ from that for US companies because of their distinctive managerial ownership structures? Does the performance effect of managerial holdings hold equally for different identity of managers, namely, individual and institutional managers? How does the interrelation between managerial identity and group affiliation influence the performance effect of managerial holdings? Recognizing the identity of managers also raises the possibility that the holdings of individual and institutional managers correlate to each other. Does the correlation imply a substitution between two types of managerial holdings in the sense that an increase of one type

of holdings will cause a reduction of the other? How does substitution between both holdings change their effects on performance, and are there differences between group and non-group firms in how substitution affects the ownership-performance relation?

Hypotheses about these questions are developed and tested by simultaneous equation models with panel data. The panel data are balanced containing information about 229 firms listed on the Taiwan Stock Exchange in 1994 for the 1995–2000 period. After unobserved firm heterogeneity and period effects are controlled in the models, empirical results suggest managerial ownership to have a significantly negative impact on firm performance. This impact confirms the argument that a higher level of managerial holdings in Taiwan's companies reflects the strengthening of family control and the entrenchment of controlling shareholders' benefits of control. Specifically, depending on whether the firm is group-affiliated or not, the holdings of individual and institutional managers have different roles in affecting firm performance. The results indicate the holdings of institutional managers in group firms to adversely affect performance most. This is due to the fact that the holdings of institutional managers tend to be a channel whereby the owners of group firms can easily arrange an ownership structure across group members to separate cash flow rights from voting rights.

Evidence also shows the holdings of individual and institutional managers to substitute for each other. Moreover, the important role of institutional managerial holdings in group firms brings about the findings implying that the substitution between both holdings is not symmetric, and that the degree of asymmetry varies with the firm's status of group affiliation. The results finally show that the effects of individual and institutional managerial holdings on performance may change once the substitution between both holdings is taken into account.

The central idea of this study is that managers are not homogeneous in making corporate policies so that it is necessary to identify the heterogeneity of managers in analyzing the effect of managerial ownership on firm performance. By hypothesizing that the motivations and behaviors of managers may vary with managerial identity and firm organizations, this paper suggests that the firm owners, even they are controlling shareholders, should understand the relation between individual and institutional managerial holdings, the difference in the

performance effects of both holdings, and how group affiliation affects this difference in order to arrange an efficient mix of managerial ownership.

The remainder of the paper is organized as follows. Section I describes the issues for managerial ownership in Taiwan and develops related hypotheses. Section II illustrates the empirical design and the data used in this study. Section III presents a discussion of empirical results, and section IV concludes the paper.

2. Issues and Hypotheses for Managerial Ownership in Taiwan

To understand the effect of managerial ownership on firm performance for Taiwan's companies, two features of the management structure are noteworthy. The first feature is that many companies are affiliated to family-controlled business groups, and the second one relates to the identity of managers in terms of individual and institutional managers.

2.1 Family-Controlled Business Groups

Like several East Asian countries, the economies of Taiwan are dominated by family-controlled conglomerates. Many large corporations in Taiwan are members of business groups, often family controlled. The members of a family, including the founder, his descendants, or the relatives through marriage, usually become the firm's controlling shareholders.

The useful function in corporate control served by business groups has been discussed in the literature concerning Japanese keiretsu organizations, for example, Aoki (1990), Flath (1993), Berglof and Perotti (1994), and Kim and Limpaphayom (1998). The tight and long-term commercial relation in the keiretsu implies that group members can serve as mutual monitors because extensive information sharing within the keiretsu enables them to evaluate each other's financial conditions, prospects, policies, and performances. However, Khanna and Palepu (2000) described the governance problems for group firms in some emerging economies. Group affiliates generally have a greater lack of transparency in the locus of control over companies than unaffiliated firms have, and hence are more insulated from external monitors. In addition, group firms usually indulge in using political connections to solicit privileges from the government and to leave financial intermediaries no incentive to monitor. These problems are particularly severe if the groups are controlled by families that attempt to protect their privacy with little information about internal activities disclosed to the public.

The structure of controlling shareholders makes worse the problem of lacking transparency

and outside monitors in business groups. Recent studies, for example, La Porta et al. (1999), Claessens et al. (2000), and Bebchuk et al. (2000), have emphasized that the separation between cash flow and control (voting) rights through dual class share structures, stock pyramids, and cross-ownership ties is usually used in conjunction with controlling-shareholder structures. Such schemes, which are called controlling-minority structures by Bebchuk et al. (2000), enable controlling shareholders (families) to exercise control over a firm while holding only a small fraction of the equity claims on cash flows. Bebchuk (1999) argued that in countries where corporate laws are lax and hence private benefits of control are large, separating cash flow rights from voting rights is a common arrangement for corporate owners to take their companies public or to raise additional outside capital. Controlling-minority structures are believed to be useful in Taiwan's family-controlled groups. In their study of East Asia countries by identifying the company's ultimate control, Claessens et al. (2000) found that for Taiwan's non-widely held companies, about 79.8% of sample companies have top managers being the relatives of the controlling shareholder's family, 43.3% of them are controlled by a single shareholder, and 49% and 8.6% of them are controlled through pyramid structures and cross-holdings respectively. Because the top management is usually part of the controlling family and because substantial cash flow rights are not retained in addition to control, controlling shareholders, whose interests may conflict with those of other parties of the firm, have abilities and incentives to expropriate from minority shareholders.

Thus, one can expect that managerial ownership is negatively related to firm performance for Taiwan's companies. Since management tends to be family-related, an increase of managerial ownership is likely to be perceived in the market as the reinforcement of family control over the firm or the exacerbation in the lack of transparency. It also represents the further deviation of cash flow rights from control rights and the entrenchment of private benefits of control for controlling shareholders. Because the agency problem arising from the expropriation of minority shareholders by controlling families is aggravated, higher managerial ownership will lead to a decrease in market-related performance of the firm. Moreover, the negative effect of managerial ownership on performance will be stronger for group firms than for non-group ones in that the controlling-minority structure is more likely to be

formed through the arrangements of ownership across group members. While studies on US data generally do not find a significantly monotonic relation between managerial ownership and performance and resort to nonlinear specifications in ownership, the negative correlation predicted here reflects the special ownership structure in the management of Taiwan's companies.

2.2 The Identity of Managers

A notable feature in the management (board and top executives) of Taiwan's companies is that it includes not only the individual shareholders and professional executives but the representatives appointed by institutional investors that hold a substantial portion of corporate shares to take board or key management positions. Institutional investors in Taiwan include corporations, financial institutions, trust funds, government agencies, and foreign institutions. Through the institutional managers, the institutions can directly secure their dominance and interests on the firm. Accordingly, there are two types of managerial ownership. One is the ownership of individual managers, and the other is the ownership of institutional managers, which represents the corporate shares held by institutions.

The differences between holdings of individual and institutional managers in their motivations and effects have generally been ignored in the literature. In their study on the majority shareholders, Holderness and Sheehan (1988) emphasized the distinction between individual and corporate large-block shareholders. They found that firms with individual and corporate majority shareholders differ in their investment policies, corporate reorganizations, and firm performance. The greatest impact on firm value comes typically from individual, rather than corporate, majority shareholders. In a recent article studying the constraints on majority shareholders, Holderness and Sheehan (2000) also pointed out that when individuals rather than corporations are majority shareholders, the firms have fewer organizational constraints on management, such as a lower ratio of outside to inside directors or a lower debt to asset ratio.

Since almost all majority shareholders are directors and officers of the firms, studies by Holderness and Sheehan suggest the identity of managers in terms of individuals and corporations (institutions) to be an important element for understanding the relation between managerial ownership and firm performance. Individual managers have larger freedom of actions than managers who are retained by institutional shareholders have. In addition, the incentive of

individual and institutional managers may differ. If diffusely held corporation A, as an institutional investor of corporation B, places representatives in the top managerial positions of B, the representatives of A would have little incentive to monitor (or to burgle) B because the benefits would accrue to all shareholders of A, not to the representatives themselves. Institutions may suffer from their own agency problems.¹

The distinction between individual and institutional managers brings into question the relation between shareholdings of both parties. There is no theory proposed in the literature to suggest how they interact with each other. However, based on the findings of Holderness and Sheehan (1988), because the same nature of ownership is held by two types of managers with different motivations in making policies, the relation between individual and institutional managers within the management tends to be competitive in view of obtaining control over the management and corporate decisions. While the size of ownership can properly represent the power over the management, one can predict that an increase in the holdings of one party crowds out the holdings of the other party, that is, there exists substitution between holdings of individual and institutional managers.² Consequently, the effect

¹ This notion is related to the issue of whether the institutional investors can play an active role in corporate control. Several studies, for example, Pound (1988), Brickley et al. (1988), McConnell and Servaes (1990), Shivdasani (1993), and Kang and Shivdasani (1995), provide evidence on how institutional investors affect the turnover of managers, the likelihood of a firm being taken over, the voting patterns in proxy contests, and the relation between directors' ownership and performance. However, empirical results are not conclusive.

² One may argue that when we cut a pie into pieces, if one is larger, the other must be smaller, and hence the so-called substitution effect is just statistical artifact. I do not think this is a proper argument for the present issue. Total managerial ownership of a firm changes over time (the size of the pie is not fixed). As can be seen in panel B of Table II, the mean value of total managerial ownership for the sample firms of this study drops by 5.5% (it is a substantial change) during 1995–2000. For that reason, a decrease in the holdings of individual managers does not necessarily imply that the holdings of institutional managers must increase. Indeed, the mean values

of a change in individual (institutional) holdings can possibly be carried to firm performance through two channels: one is its direct effect on performance, and the other is the indirect effect on performance through institutional (individual) holdings as a result of substitution between both holdings. For example, suppose that both individual and institutional managerial holdings adversely affect performance and that the negative effect is stronger for institutional ones, the substitution effect will imply the possibility that an increase in individual holdings gives rise to higher performance even though the direct effect is to depress performance. The reason is that it can substitute for the shares of institutional managers, of which the negative impact on performance is more pronounced, to create a positive indirect effect large enough to offset the direct one. Examining the direct and indirect effects seems to be necessary once the identity of managers is taken into account.

2.3 Managerial Identity, Business Groups, and Ownership-Performance Relation

Incorporating the two features described above into the ownership-performance relation, hypotheses concerning how shareholdings of individual and institutional managers affect firm performance and how their effects vary with group affiliation can be built up.³

of both individual and institutional managerial holdings decline during 1995–2000. Even though the decrease in one party's holdings causes the other party's holdings to increase, is the magnitude of the increase in individual holdings when institutional holdings decrease the same as that of the reverse case? If not, what leads to this asymmetric substitution? How does substitution vary with the group affiliation of the firm and affect the relation between managerial ownership and firm performance? The cutting-pie argument is too simple to answer these questions.

³ After the studies of La Porta et al. (1999) and Claessens et al. (2000) in investigating the issue of ultimate control, many researchers accept that an analysis of the causes and consequences of ownership cannot be properly performed for the countries where the controlling-minority ownership structures are common, for example, the East Asian ones, unless an ultimate ownership measure is used. However, hypotheses and empirical specifications of this study are still based on immediate ownership instead of ultimate control. One purpose of this study is to examine the different effects of individual and institutional

An important difference between shares held by individual and institutional managers lies in that the ownership of institutional managers tends to be a medium through which the controlling-minority structure can be arranged. These arrangements help owners of firms hold small equity claims on cash flows without losing the voting rights. Compared with the holdings of individual managers, an increase in the holdings of institutional managers is thus more likely to represent the owner's intention to strengthen the controlling-minority structure and to expropriate from minority shareholders. No matter what the firm organization is, either group or non-group firms, institutional managerial ownership is expected to have a larger magnitude of the negative (direct) performance effect than individual one has.

The difference in the performance effect between institutional and individual managerial ownership, however, is greater for group firms than for non-group ones. The controlling owners of group firms have greater incentives and abilities to arrange a controlling-minority structure because of their desire to secure control over group members and because the structure can be easily formed via the holdings of corporations, financial institutions, and other institutions within the groups. Therefore, the tendency of the enhancement of the owner's controlling power and of a further deviation of cash flow rights from voting rights when the holdings of institutional managers increase will be stronger for group affiliates.

Furthermore, the direct effect of a particular type of managerial ownership (either institutional or individual) on firm performance will not hold

managerial holdings on performance in firms with different status of group affiliation. This aim cannot be reached if the ownership is measured in ultimate control. Even though all holdings of individual and institutional managers directly or indirectly belong to the same controlling owners, I believe that changes in the holdings of individual and institutional managers will convey different information to the market and hence have different performance effects. It is not appropriate to argue that individual and institutional managers have homogeneous behavior and ignore the interrelation between both parties just because they have the same controlling owners. To arrange an efficient managerial ownership structure, the owners of firms, even in the controlling-minority structures, have to understand the motivations and effects of holdings of different identity of managers.

equally for group and non-group firms, and both firm organizations also differ in the substitution between individual and institutional managerial ownership. Because the holdings of institutional managers can facilitate the arrangement of controlling-minority structures in business groups, they will have a larger impact on firm performance and be less likely to be replaced by individual managerial holdings for group firms than for non-group firms. However, it is not so straight to predict how group and non-group firms differ in the effect of individual managerial holdings and in the potential of its being replaced by institutional ones. Intuitively, since institutional holdings are crucial for the structure of business groups, the importance and the irreplaceable role of individual managerial ownership in affecting firm performance tend to be observed in non-group firms.

There may exist asymmetric substitution within managerial ownership in the sense that substitution of institutional for individual ownership is different from that of individual for institutional one. For both group and non-group firms, we can predict that the holdings of institutional managers are more likely to be replaced than individual managerial holdings are in that institutional investors usually have diverse portfolio holdings, and hence have a relatively weak will to stick to the holdings of a specific company. However, group firms are expected to have a smaller degree of asymmetric substitution than non-group firms have because as noted earlier, institutional holdings are useful for the owners of business groups to secure their group members as well as to obtain benefits from separation of cash flow rights and voting rights. This role increases the importance of institutional shares in group firms and reduces the potential of being replaced by individual holdings.

Under the premise that the direct performance effects of individual and institutional managerial holdings and the substitution effect between them are all negative, the indirect performance effects of both holdings must be positive. As a result, to what extent are the negative direct effects of both types of managerial holdings mitigated by the positive indirect effects in different organizations of the firm is an issue remained for empirical investigations.

In sum, Taiwan's managerial ownership structure brings up several questions that connect the ownership-performance relation with managerial identity and group affiliation. Hypotheses and issues proposed in this section are summarized in panel A of Table I. Testing these

hypotheses not only helps understand the relation between performance and distinctive ownership structures of Taiwan, but shares the notion emphasized by Holderness and Sheehan (1988, 2000) to reveal different roles played by individual and institutional managers in determining firm performance.

3. Model Specification and Data

To address the questions I have posed, I employ two simultaneous equation models to examine a panel data set made up of Taiwan's listed corporations. The first one is a two-equation model, in which total managerial shareholdings (MH) and firm performance (Tobin's Q) are endogenous. The second one is a three-equation model, in which shareholdings of individual managers (MH-IND), shareholdings of institutional managers (MH-INST), and firm performance are endogenous. The purpose of using simultaneous equation models with panel data is to deal with the endogeneity of managerial ownership in studying its effect on firm performance.

The endogeneity of managerial ownership in regressing firm performance on managerial ownership can be considered in two folds. First, performance (the regressand) is at least as likely to affect ownership (the regressor) as ownership is to affect performance. That is, the causality between firm performance and managerial ownership can go either way. Previous studies using simultaneous equation models have generally accepted the argument that the ownership structure is endogenous and determined, among other observed factors, by firm performance. Demsetz and Villalonga (2001) pointed out that the insider information creates the incentive for managers to change their holdings according to their expectation of future firm performance, and that the performance-based compensation in the form of stock options also raises the possibility that firm performance is likely to affect managerial ownership.

Second, it is possible that the relation between performance and managerial ownership is neither a correlation running from ownership to performance nor a reverse correlation in which performance affects ownership, but rather a spurious relation attributed to unobserved heterogeneity among firms. Suppose there is an unobserved firm characteristic that is positively related to both performance and managerial ownership. If the variables for this unobserved characteristic are omitted from the specification, a regression of firm performance on managerial ownership will spuriously indicate a positive relation because managerial ownership is a

positive proxy for this firm characteristic. Using panel data and assuming unobserved firm heterogeneity to be the "fixed individual effect" is a way to mitigate the endogeneity caused by the spurious relation. This method was emphasized in the study of Himmelberg et al. (1999).

The structural equations for both models to be estimated are as follows.

Model 1:

$$MH_{it} = \mu_1 + \alpha_{1t} + \delta_{1t} + \beta_{11}Q_{it} + \beta_{12}SIZE_{it} + \beta_{13}AGE_{it} + \beta_{14}RISK_{it} + \beta_{15}RISK_{it}^2 + \beta_{16}DEBT_{it} + \beta_{17}GROUP_{it} + \beta_{18}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it} \quad (1)$$

$$Q_{it} = \mu_2 + \alpha_{2t} + \delta_{2t} + \beta_{21}MH_{it} + \beta_{22}ADV_{it} + \beta_{23}R\&D_{it} + \beta_{24}FIX_{it} + \beta_{25}DEBT_{it} + \beta_{26}GROUP_{it} + \beta_{27}(MH_{it} \times GROUP_{it}) + \varepsilon_{2it} \quad (2)$$

Model 2:

$$MH-IND_{it} = \mu_1 + \alpha_{1t} + \delta_{1t} + \gamma_{11}MH-INST_{it} + \gamma_{12}Q_{it} + \gamma_{13}SIZE_{it} + \gamma_{14}AGE_{it} + \gamma_{15}RISK_{it} + \gamma_{16}RISK_{it}^2 + \gamma_{17}DEBT_{it} + \gamma_{18}GROUP_{it} + \gamma_{19}(MH-INST_{it} \times GROUP_{it}) + \gamma_{110}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it} \quad (3)$$

$$MH-INST_{it} = \mu_2 + \alpha_{2t} + \delta_{2t} + \gamma_{21}MH-IND_{it} + \gamma_{22}Q_{it} + \gamma_{23}SIZE_{it} + \gamma_{24}AGE_{it} + \gamma_{25}RISK_{it} + \gamma_{26}RISK_{it}^2 + \gamma_{27}DEBT_{it} + \gamma_{28}GROUP_{it} + \gamma_{29}(MH-IND_{it} \times GROUP_{it}) + \gamma_{210}(Q_{it} \times GROUP_{it}) + \varepsilon_{2it} \quad (4)$$

$$Q_{it} = \mu_3 + \alpha_{3t} + \delta_{3t} + \gamma_{31}MH-INST_{it} + \gamma_{32}MH-IND_{it} + \gamma_{33}DEBT_{it} + \gamma_{34}GROUP_{it} + \gamma_{35}(MH-INST_{it} \times GROUP_{it}) + \gamma_{36}(MH-IND_{it} \times GROUP_{it}) + \gamma_{37}ADV_{it} + \gamma_{38}R\&D_{it} + \gamma_{39}FIX_{it} + \varepsilon_{3it} \quad (5)$$

i and t represent individual firm and period respectively. Tobin's Q appears as an explanatory variable in MH, MH-IND, and MH-INST equations because of the potential causality running from performance to ownership. In model 2, to consider the substitution between holdings of individual and institutional managers, MH-INST is included as an explanatory variable in the MH-IND equation, and MH-IND is also an explanatory variable in the MH-INST equation. MH is measured as the percentage of the firm's common equity held by all directors and top executives. MH-IND and MH-INST are holdings of individual and institutional directors and top executives respectively. Tobin's Q is defined as the ratio of the value of the firm to the replacement value of assets. The value of the firm is equal to the market value of common equity plus the market value of preferred stock plus the book value of total liabilities. The book value of total assets is proxy for the replacement value of assets. The annual values of MH, MH-IND, MH-INST, and Q are computed for the arrangement of panel data.

Exogenous variables in both models include firm size (SIZE), firm age (AGE), business risk (and its squared term) (RISK and RISK²), the value of debt (DEBT), advertising expenditures (ADV), research and development expenditures (R&D), expenditures on fixed capital (FIX), and the status of group affiliation (GROUP). The terms interacting firm performance, total managerial holdings, individual managerial holdings, and institutional managerial holdings with the status of group affiliation, that is, Q \times GROUP, MH \times GROUP, MH-IND \times GROUP, and MH-INST \times GROUP, are added to the regressions.

Firm size (SIZE) is measured by the logarithm of the annual book value of assets. The larger is the firm size, the larger is the amount that has to be invested in the firm for a given fraction of equity. Financial constraints will prevent managers from owning a high percentage of equity. Moreover, to attain a given degree of control or to induce a given interest-converging incentive of managers, a smaller share of the firm is required as firm size increases. Both effects imply managerial ownership to decrease with firm size.

However, for the ownership structure of Taiwan companies, the size effect is more complicated. As already noted, Bebchuk's (1999) idea suggests that in countries where capital markets and legal systems are not so developed that the private benefits of control are large, the companies' owners have a strong incentive to sell cash flow rights without giving up control rights when they decide to extend the business through equity financing. That is, expansion in firm size is usually accompanied by the adoption of pyramids or cross-ownership. As a result, managerial ownership, particularly institutional managerial holdings, tends to grow with firm size. The negative size-ownership relation may not gain support in Taiwan's data.

Firm age (AGE) is measured as the logarithm of the number of years since the firm's first incorporation. The life-cycle theory suggests that younger firms are more likely to have concentrated ownership, while older firms are more frequently widely held. The annual business risk of the firm (RISK) is estimated as the standard deviation of the firm's weekly stock market rates of return. Demsetz and Lehn (1985) argued that greater payoff potential in maintaining tighter control in noisier environments will call for greater ownership concentration. Because managerial behavior is more difficult to monitor and more crucial in profitability when the firm's environment is less predictable, higher risks will increase the value of incentive contracts with large

managerial ownership. However, the cost of higher managerial holdings because of reduced portfolio diversification is raised as the risk increases. It is expected that business risks are positively related to managerial ownership, but the increase in ownership associated with a given increase in the risk diminishes. The squared value of the business risk (RISK²) is used to examine the nonlinear relation between risks and ownership.

The value of debt (DEBT) is measured as the ratio of annual book value of debt to total assets. According to Jensen's (1986) "control hypothesis" for debt, debt reduces the free cash flow available for spending at the discretion of managers by bonding managers' promise to make the interest and principal payments. So in the ownership equation, a larger value of debt will be associated with lower managerial ownership because it reduces the importance of managerial ownership being a convergence-of-interest mechanism. In addition, if creditors do provide monitoring of management, debt issue can discourage managers to entrench themselves through larger shareholdings. The value of debt is also included in the performance equation to examine whether the benefits of debt in motivating managerial and organizational efficiency can exceed the agency costs of debt, suggested by Jensen and Meckling (1976), to enhance firm performance.

Following the specification of Demsetz and Villalonga (2001), variables of advertising and R&D expenditures (ADV and R&D) and fixed capital expenditures (FIX) are included in the performance equation to control the accounting distortion in Tobin's Q arising from the omission of intangible assets (advertising and R&D) in the denominator of the Q value and from the differences between accounting and true rates at which fixed assets are depreciated. ADV is measured as the ratio of annual advertising expenditures to annual sales, and R&D is the ratio of annual research and development expenditures to annual sales. FIX is measured by the ratio of annual expenditures on plant and equipment to annual sales. The accounting distortion caused by the depreciation rates is likely to take place for firms that fixed assets are important in the asset structure, that is, the value of FIX is large.

The main feature of above simultaneous equation models is the inclusion of the dummy variable GROUP, which is equal to one if the firm is affiliated to business groups, and its interaction terms with MH, MH-IND, MH-INST, and Q. These variables are purposed to examine the differences between group and non-group firms in the effect of total managerial ownership on firm

performance, in the roles played by individual and institutional managers to affect performance, in how substitution between the holdings of individual and institutional managers changes their respective effects on performance, and in how total, individual, and institutional managerial holdings respond to changes of performance.

Panel B of Table I restates the hypotheses developed in section I in terms of coefficients of the models. Both models are two-way fixed effects specification, in which the individual effects for each firm (dummy variables α_i) and the time effects for each period (dummy variables δ_t) are both taken into account. One of the time effects must be dropped to avoid perfect collinearity. Since each of the individual effects is an individual-specific intercept but the time effects are comparisons to a base period, as suggested by Greene (2000), an overall constant (μ) must be included to formulate a symmetric form of the model. All equations in both models are over-identified so that the two-stage least squares (2SLS) methodology can be used. It must be noted that the terms interacting endogenous variables, MH, MH-IND, MH-INST, and Q, with GROUP are added to the models. Hence, the reduced form equations in the 2SLS method must be estimated by including all exogenous variables and their products with GROUP as instruments.

The sample of this study is restricted to non-financial firms that were listed on the Taiwan Stock Exchange in 1994 and had no missing data over the period 1995–2000. There are 282 listed companies in 1994. Twenty-nine financial firms and others with missing data on ownership for subsequent periods are excluded from the sample. The whole data panel is therefore balanced and includes 1374 observations for 229 firms.⁴ Except the variable GROUP, data required to calculate the variables defined above are collected from the database maintained by *Taiwan Economic Journal*. Information about a firm's affiliation with business groups is available from *Business Groups in Taiwan* published by *China Credit Information Service*, which provides the most reliable data for business groups of Taiwan. The status of the firm's

⁴ The sample selection prevents entry and exit during 1995–2000. New firms and firms that go busted are likely to have abnormal transactions in the corporate shareholdings. To avoid econometric biases, it is not appropriate to add them to the firms with normal operation in examining the ownership-performance relation.

group affiliation may change during 1995–2000. Of 1374 observations, 741 are classified as group affiliates.

4. Empirical Results

4.1 Summary Statistics

Table II reports some summary statistics. Panel A contains descriptive statistics for the variables used in the models, and panel B shows the changes in the mean values of managerial ownership and Q over the period 1995–2000. The mean values in panel A suggest that, relative to non-group firms, group affiliates have lower Q, higher percentages of total and institutional managerial holdings (MH and MH-INST), and lower percentages of individual managerial holdings (MH-IND). All of these differences are significant at conventional levels. Also, the mean value of MH-INST is larger than that of MH-IND (almost double) for group firms, but is smaller for non-group firms. These results reflect the intention of group owners to take control of their member firms through the holdings of institutional managers. Group firms are also larger and older, have lower business risks, and sell less debt. The mean values of advertising, R&D, and fixed capital expenditures of group firms, however, are not significantly different from those of non-group firms.

Panel B indicates that the mean values of MH, MH-IND, MH-INST, and Q decline simultaneously during the sample period. Relative to 1995, while the average Q of all sample firms drops by 0.816, from 1.648 to 0.832, in 2000, the mean values of MH, MH-IND, and MH-INST also decrease by 0.0549, 0.0451, and 0.01 respectively. It implies that for the pooled data, the period effects will strengthen or cause spurious positive relation between managerial ownership and Q, even though the relation does not exist or the true correlation is negative. Without controlling the period effects, the correlation between managerial ownership and performance is upward biased. Meanwhile, changes of MH-INST are relatively constant over periods suggesting that the decline in MH is largely attributed to changes of MH-IND, and that the correlation between MH-IND and Q is biased by the period effects to a degree larger than that between MH-INST and Q.

Panel B also reveals that although the average Q's of both group and non-group firms drop by around 48 % from 1995 to 2000, the reduction in MH for group firms (0.0394) is only a half of that for non-group firms (0.0734). Also, the declines in the mean values of MH-IND and MH-INST are similar for group firms (0.02 and

0.0194), but are different for non-group firms (0.0607 and 0.0127). These imply the differences between group and non-group firms in the correlation between managerial ownership and firm performance and in the bias of the ownership-performance relation caused by the period effects.

To summarize, period effects are an important factor that has to be controlled in analyzing the relation between managerial ownership and performance, at least for the data of Taiwan's companies. The correlations implied in panel B of Table I, however, do not suggest any causality. One cannot identify whether the movements of MH, MH-IND, MH-INST, and Q in the same direction during the sample period are the causality running from managerial ownership to performance or the reverse. A formal analysis of simultaneous equation models is necessary to solve this problem.

4.2 Ownership of All Managers and Performance

Empirical results of the simultaneous equation models are presented in Table III and IV. Table III reports the results of the model 1, in which the effect of total managerial holdings on performance is analyzed. Table IV is the results of the model 2, which emphasizes the different effects of individual and institutional managerial holdings on performance.

Panel A of Table III is the results for the MH equation, and panel B shows the results for the Q equation. I report estimated coefficients for (1) the regression with pooled data, where the individual firm effects (unobserved firm heterogeneity) and period effects are not controlled ($\alpha_i = \delta_t = 0$) and an overall constant (μ) is the intercept, (2) the regression controlling unobserved firm heterogeneity, where each of individual effects is an individual-specific intercept (α_i) and $\mu = \delta_t = 0$, and (3) the regression controlling both unobserved firm heterogeneity and period effects so that α_i , δ_t , and μ are required. To save the space, estimated results of α_i and δ_t are not reported.

One may notice that for both non-group and group firms, after the firm effects are controlled (regression (2)), the significance for Q's positive effect in the regression (1) of the MH equation disappears (the effect turns to negative for non-group firms), and the positive effect of MH in the Q equation increases remarkably. When the period effects are further controlled (regression (3)), the Q's negative effect on MH is enhanced a little for non-group firms, but its effect remains insignificant for group firms. However, MH's

effect on Q has a significant change shifting from positive to negative for both group and non-group firms. In short, while unobserved firm characteristics bias both the effect of Q on MH and of MH on Q, the period effects merely influence the effect of MH on Q. Hence, as Table II suggests that the period effects may create the positive correlation between MH and Q, results of Table III show that it is the effect of MH on Q (causality from MH to Q) to be affected by time. These findings confirm the importance of using panel data techniques to control unobserved firm heterogeneity and period effects in investigating the true relation between managerial ownership and performance.

Turning to the regression (3) where the firm and period effects have been controlled, the negative coefficient of Q in the MH equation implies that management of non-group firms tends to hold fewer (sell) shares when firms perform well, perhaps in the expectation that poorer performance will arrive in the subsequent periods. This kind of managerial behavior, however, cannot be seen for group firms. By adding up the coefficients of Q and $Q \times \text{GROUP}$, the effect of Q on MH for group firms (shown at the bottom of panel A) is insignificant.

Unlike the findings of prior studies, firm size does not have a negative effect on managerial holdings. An insignificant coefficient of SIZE supports the argument that expansion of firm size in Taiwan is usually along with the pyramid and cross-ownership arrangements, which increase managerial holdings and offset the presumed negative size effect. As predicted by the life-cycle theory that dispersion of ownership is just a matter of time, a negative coefficient of AGE means old firms to have less concentrated managerial ownership.

The effects of business risks (RISK) and debt values (DEBT) on MH change considerably when unobserved firm heterogeneity is controlled, and remain stable as the period effects are further fixed. The coefficients of RISK and squared RISK indicate that a higher business risk increases the value of contracts using large managerial ownership as a monitoring mechanism, but that the increase in managerial ownership diminishes as the risk further increases because the non-diversification costs of managerial holdings are getting large. Since the negative coefficient of DEBT is not significant, total managerial holdings are not shown to decrease if creditors are important to the monitoring of management.

Recall that differences in the mean values of RISK and DEBT between group and non-group

firms are significant in Table II. To distinguish these differences, I also run the regression with $RISK \times GROUP$ and $DEBT \times GROUP$ included in the MH equation ($DEBT \times GROUP$ is also added to the Q equation). In the regression (3'), the effect of RISK for group firms, obtained by adding up the coefficients of RISK and $RISK \times GROUP$, is significant (p -value is 0.0008). Therefore, the response of MH to the change of RISK in the regression (3) is primarily attributed to the behavior of group firms. The risk effect is very weak for non-group firms. This seems to imply the flexibility of group firms to adjust managerial ownership in the face of high business risks, probably due to the mechanism of "internal capital market" formed by group members.

While DEBT almost has no effect for group firms (p -value is 0.605), it does have some negative effects on managerial holdings for non-group firms, although the significance is not very high (t -value is -1.556). The significant difference in the debt's effect between group and non-group firms (the coefficient of $DEBT \times GROUP$) suggests that both firm organizations differ in the nature of managerial ownership. Increasing managerial holdings in group firms tends to be a strategy for controlling owners to keep control over member firms, and does not play the incentive mechanism to reduce agency costs. The monitoring of creditors to substitute for managerial ownership in mitigating agency problems is less likely to be seen for group firms.

Coefficients of GROUP and $Q \times GROUP$ in the regression (3) indicate that for firms with Q less (larger) than 1.508, group affiliation tends to reduce (increase) MH.⁵ An unreported calculation reveals that the negative effect of group affiliation on MH is significant (p -value < 0.1) when Q is less than 1.095, and that the positive effect is significant (p -value < 0.1) if Q is larger than 2.345. For 1374 observations, 938 (68.3%) observations have Q less than 1.508 (negative affiliation effect), and 649 (47.2%) are in the range of significance ($Q < 1.095$). On the other hand, 436 (31.7%) observations have Q larger than 1.508 (positive affiliation effect), and only 131 (9.5%) are in the

⁵ Although Table II shows the mean value of MH to be larger for group firms than for non-group firms, we cannot say that the effect of group affiliation is to increase managerial holdings before controlling other factors affecting MH or considering its possible interaction with other variables, such as Q suggested here.

range of significance ($Q > 2.345$). For Taiwan's companies, it seems that group affiliation is more likely to adversely affect MH or does not have significant impacts on MH. One explanation is that to attain a given level of Q, because of mutual monitoring among group members, group firms may have less reliance on higher managerial holdings in the incentive contracts to mitigate agency problems. Another simple explanation is that echoing the findings on the value of debts, this result is caused by different roles played by managerial ownership in group and non-group firms. The level of managerial holdings for group owners to control their member firms is just lower on the average.

For the Q equation of panel B, the regression (3) shows that MH has a significantly negative impact on Q for both non-group and group firms ($\beta_{21} < 0$ and $\beta_{21} + \beta_{27} < 0$). Greater ownership concentration by managers does lead to a more entrenched management and hence depress firm performance. The magnitude of MH's negative effect is larger for group firms than for non-group firms ($\beta_{27} < 0$), although the difference is not significant. Supporting the hypothesis 1 and 2 shown in Table I, a higher level of managerial holdings reflects the strengthening of family control and the entrenchment of controlling shareholders' benefits, particularly for group firms in which the controlling-minority structure can be easily arranged.

The effects of ADV and R&D are sensitive to unobserved firm heterogeneity and period effects. In other words, the panel data econometric method minimizes the measurement error in Tobin's Q caused by the accounting distortion. The negative coefficient of FIX implies that the distortion arising from the difference between accounting and true depreciation rates reduce the Q value significantly. DEBT is positively related to Q. This effect is irrelevant to unobserved firm heterogeneity and period effects, and holds for both group and non-group firms. The control benefits of debt in motivating organizational efficiency are proved to exceed the agency costs of debt to enhance firm performance. The insignificant coefficients of GROUP and $MH \times GROUP$ show that the benefit of group affiliation in improving firm performance is very weak and does not vary with the level of managerial holdings.

4.3 Ownership of Individual and Institutional Managers and Performance

Table IV is the regression results of the model 2 after controlling unobserved firm

heterogeneity and period effects.⁶ To clarify how group and non-group firms differ in the relation between MH-IND, MH-INST, and Q, Table V uses the estimated results of Table IV to report direct effects, indirect effects, which are derived from the substitution between holdings of individual and institutional managers, and total effects, which add up the direct and indirect effects, in four categories: the effect of Q on MH-IND, the effect of Q on MH-INST, the effect of MH-IND on Q, and the effect of MH-INST on Q. For example, in the category of “Q’s effect on MH-IND”, the total effect of Q on MH-IND for non-group firms is the sum of the direct effect (the coefficient of Q in the MH-IND equation, γ_{12}) and the indirect effect, which is the product when the Q’s effect on MH-INST (the coefficient of Q in the MH-INST equation, γ_{22}) is multiplied by the substitution of MH-INST for MH-IND (the coefficient of MH-INST in the MH-IND equation, γ_{11}), that is, $\gamma_{12} + \gamma_{11} \cdot \gamma_{22}$. Similarly, the total effect of Q on MH-IND for group firms is equal to $(\gamma_{12} + \gamma_{110}) + (\gamma_{11} + \gamma_{19}) \cdot (\gamma_{22} + \gamma_{210})$.

Focus on the substitution effect first. Table IV shows that for non-group firms, substitution of MH-IND for MH-INST (γ_{21}) is much more pronounced than that of MH-INST for MH-IND (γ_{11}), that is, $\gamma_{21} < \gamma_{11}$. While 1% increase in MH-IND can substitute for 1.92% of MH-INST, only 0.38% reduction in MH-IND for 1% increase in MH-INST. Group firms also have this kind of asymmetric substitution between individual and institutional holdings ($\gamma_{21} + \gamma_{29} < \gamma_{11} + \gamma_{19}$). They support the hypothesis 5 of Table I that the holdings of institutional managers are more likely to be replaced because the diverse portfolio of institutional investors prevents them from sticking to the holdings of a specific company. Meanwhile, γ_{29} is shown to be larger than γ_{19} . Consistent with the hypothesis 5, the degree of asymmetric substitution is larger for non-group firms than for group firms. The control-securing and benefit-entrenching role of institutional ownership in group firms reduces the likelihood of its being replaced by individual holdings. The fact that $\gamma_{19} < 0$ and $\gamma_{29} > 0$ also supports the hypothesis 6 that the holdings of institutional managers are more difficult to be replaced by and more likely to

substitute for holdings of individual managers in group firms than in non-group firms.

In this study, I do not develop hypotheses about how performance affects the holdings of individual and institutional managers, but we can observe the difference between individual and institutional managers in responding to the change of performance from Table V. The direct effect of Q on managerial holdings, either MH-IND or MH-INST, for non-group firms is not significant. Since the indirect effects are trivial, the total effects remain insignificant. For group firms, both direct and total effects of Q on MH-INST are significantly negative. While the direct effect of Q on MH-IND is negligible, the Q’s effect on MH-INST along with the substitution of MH-INST for MH-IND create an important indirect effect to make the total effect of Q on MH-IND become positive. In sum, as firm performance changes, the incentive of managers to alter their holdings plus the adjustment of the ownership structure via the substitution between individual and institutional managerial holdings cause MH-IND and MH-INST of group firms to change in opposite directions.

Back to Table IV, for both group and non-group firms, either MH-IND or MH-INST has a direct effect that is negatively related to Q ($\gamma_{31} < 0$, $\gamma_{31} + \gamma_{35} < 0$, $\gamma_{32} < 0$, $\gamma_{32} + \gamma_{36} < 0$) and the negative effect of MH-INST is stronger than that of MH-IND ($\gamma_{31} < \gamma_{32}$, $\gamma_{31} + \gamma_{35} < \gamma_{32} + \gamma_{36}$). They are consistent with the hypothesis 1 and 3. Also echoing the hypothesis 3, the finding that γ_{35} is smaller than γ_{36} suggests the difference between the effects of MH-INST and MH-IND to be larger for group firms than for non-group firms. The fact that $\gamma_{35} < 0$ and $\gamma_{36} > 0$ supports the notion of hypothesis 4. Institutional managerial holdings for group firms are connected with the arrangement of controlling-minority structures and the enhancement of the owner’s controlling power, and hence drive down firm performance at a larger extent.

Adding the indirect effect generated by substitution between MH-IND and MH-INST to the direct effect, Table V shows that for both group and non-group firms the total effect of MH-INST on Q remains significantly negative, but the magnitude is reduced. However, the indirect effect is large enough to turn the total effect of MH-IND into significant positive. The implication is that we may observe an increase in the holdings of individual managers to be beneficial to firm performance; however, the improvement in performance is caused by the individual holdings to substitute for the institutional ones, which are

⁶ The pattern of how unobserved firm heterogeneity and period effects change the regression results is similar to Table III. Therefore, only the results of the regression controlling both effects are reported.

likely to depress more performance.

While the coefficient of GROUP is positive in the MH-IND equation, the negative coefficient of MH-INST \times GROUP suggests that the positive affiliation effect on the holdings of individual managers decreases as the level of institutional holdings gets higher and will change to negative when the institutional holdings are high enough (MH-INST > 0.166). Similarly, although the effect of GROUP is negative in the MH-INST equation and can be enhanced as the Q value increases (the coefficient of Q \times GROUP is negative), the coefficient of MH-IND \times GROUP implies that group affiliation is positively related to the holdings of institutional managers as the individual holdings reach a higher level (MH-IND > 0.096 if Q is equal to one). Recall that Table II indicates group firms on the average to have higher institutional managerial holdings and lower individual ones than non-group firms have. The results here suggest that the observations having large MH-INST or MH-IND are responsible for that evidence.

SIZE, AGE, RISK, ADV, R&D, FIX and DEBT in Table IV reveal similar information as in Table III. Some particular findings are worth mentioning. SIZE has a significantly positive impact on MH-INST but has no effect on MH-IND. Since institutional managerial ownership is closely related to controlling-minority structures, this result reinforces the notion that the firms' owners usually use such ownership arrangements to expand firm size for not losing their control rights. Relative to its effect on total managerial ownership, RISK still positively affects individual and institutional managerial holdings, but the significance level is diminished. While DEBT's effect on total managerial holdings is not significant, evidence shows that after the interrelation between individual and institutional holdings has been considered individual and institutional managers reduce their holdings if creditors exercise their monitoring of management. The benefit of group affiliation in increasing performance is weak and irrelevant to the level of total managerial ownership in Table III, whereas results here show that the irrelevance of total managerial holdings to the effect of group affiliation on performance is due to the fact that institutional and individual managerial holdings have opposite impacts on the affiliation-performance relation. The negative coefficient for MH-INST \times GROUP and positive one for MH-IND \times GROUP (t -value is lower) suggest the effect of group affiliation on

performance to decrease with institutional managerial holdings but to increase with individual ones.

5. Conclusions

Family-controlled business groups and managerial ownership held by individual and institutional managers are two features characterizing the ownership structure of Taiwan's corporations. They complicate the relation between managerial ownership and firm performance, and raise questions rarely considered in the literature. In this paper, I provide an empirical analysis to distinguish the impacts of individual and institutional managerial ownership on performance in different organizations of the firm, that is, group and non-group firms. A number of findings that are different or not available in the prior studies based on US data are obtained. It is notable that the empirical results of this study are not specific to Taiwan. They can be applied to several East Asian countries that have similar ownership structures.

Empirical results suggest that managerial ownership is negatively related to firm performance and that the effects of individual and institutional managerial holdings on performance vary with the firm's status of group affiliation. Institutional managerial holdings have the performance effect larger than individual ones have for both group and non-group firms, but the difference between both effects is larger for group firms. In addition, for the holdings of institutional managers, their performance effect is larger in group firms than in non-group firms, while the reverse is true for the holdings of individual managers.

The results also show asymmetric substitution between holdings of individual and institutional managers. Substitution of individual for institutional holdings is more pronounced than that of institutional for individual ones for both group and non-group firms, but the degree of asymmetry is larger for non-group firms. Meanwhile, the degree to which institutional (individual) managerial holdings can be replaced by individual (institutional) ones is lower (higher) for group firms than for non-group firms. All of these findings imply the importance and the irreplaceable role of institutional managerial ownership in business-group firms. Once the substitution between both holdings is taken into account, the negative impact of institutional managerial holdings on firm performance is mitigated, and that of individual holdings turns to positive.

Other explanatory variables, such as firm

size and the value of debt, also provide indirect evidence to support the hypotheses proposed in this study. Accordingly, this paper leads us to conclude that the identity of managers, in terms of individual and institutional representatives, and its connection with the firm's status of group affiliation could prove important for understanding the impact of managerial ownership on firm performance.

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Table I. Hypotheses for Managerial Ownership and Firm Performance

Panel A summarizes the hypotheses developed in section I. They connect the ownership-performance relation with managerial identity and group affiliation. Since both the effect of managerial holdings on firm performance and the substitution between individual and institutional managerial holdings are hypothesized to be negative, the comparisons made in the following hypotheses are based on the absolute values of the effects. Panel B describes the hypotheses in terms of the coefficients of the following two simultaneous equation models.

Model 1:

$$MH_{it} = \mu_1 + \alpha_{1i} + \delta_{1i} + \beta_{11}Q_{it} + \beta_{12}SIZE_{it} + \beta_{13}AGE_{it} + \beta_{14}RISK_{it} + \beta_{15}RISK_{it}^2 + \beta_{16}DEBT_{it} + \beta_{17}GROUP_{it} + \beta_{18}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it}$$

$$Q_{it} = \mu_2 + \alpha_{2i} + \delta_{2i} + \beta_{21}MH_{it} + \beta_{22}ADV_{it} + \beta_{23}R\&D_{it} + \beta_{24}FIX_{it} + \beta_{25}DEBT_{it} + \beta_{26}GROUP_{it} + \beta_{27}(MH_{it} \times GROUP_{it}) + \varepsilon_{2it}$$

Model 2:

$$MH-IND_{it} = \mu_1 + \alpha_{1i} + \delta_{1i} + \gamma_{11}MH-INST_{it} + \gamma_{12}Q_{it} + \gamma_{13}SIZE_{it} + \gamma_{14}AGE_{it} + \gamma_{15}RISK_{it} + \gamma_{16}RISK_{it}^2 + \gamma_{17}DEBT_{it} + \gamma_{18}GROUP_{it} + \gamma_{19}(MH-INST_{it} \times GROUP_{it}) + \gamma_{110}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it}$$

$$MH-INST_{it} = \mu_2 + \alpha_{2i} + \delta_{2i} + \gamma_{21}MH-IND_{it} + \gamma_{22}Q_{it} + \gamma_{23}SIZE_{it} + \gamma_{24}AGE_{it} + \gamma_{25}RISK_{it} + \gamma_{26}RISK_{it}^2 + \gamma_{27}DEBT_{it} + \gamma_{28}GROUP_{it} + \gamma_{29}(MH-IND_{it} \times GROUP_{it}) + \gamma_{210}(Q_{it} \times GROUP_{it}) + \varepsilon_{2it}$$

$$Q_{it} = \mu_3 + \alpha_{3i} + \delta_{3i} + \gamma_{31}MH-INST_{it} + \gamma_{32}MH-IND_{it} + \gamma_{33}DEBT_{it} + \gamma_{34}GROUP_{it} + \gamma_{35}(MH-INST_{it} \times GROUP_{it}) + \gamma_{36}(MH-IND_{it} \times GROUP_{it}) + \gamma_{37}ADV_{it} + \gamma_{38}R\&D_{it} + \gamma_{39}FIX_{it} + \varepsilon_{3it}$$

<i>Panel A. Hypotheses</i>		<i>Panel B. Hypotheses in terms of Coefficients of the Models</i>
Hypothesis 1	The direct effect of managerial holdings on performance is negative.	$\beta_{21} < 0, \beta_{21} + \beta_{27} < 0, \gamma_{31} < 0,$ $\gamma_{31} + \gamma_{35} < 0, \gamma_{32} < 0, \gamma_{32} + \gamma_{36} < 0$
Hypothesis 2	The direct effect of total managerial holdings on performance is larger for group firms than for non-group firms.	$\beta_{27} < 0$
Hypothesis 3	For both group and non-group firms, institutional managerial holdings have a larger direct effect on performance than individual ones have. However, the difference between the effects of institutional and individual holdings is larger for group firms than for non-group firms.	$\gamma_{31} < \gamma_{32}, \gamma_{31} + \gamma_{35} < \gamma_{32} + \gamma_{36},$ $(\gamma_{32} + \gamma_{36}) - (\gamma_{31} + \gamma_{35}) > (\gamma_{32} - \gamma_{31})$ $\Rightarrow \gamma_{36} > \gamma_{35}$

Hypothesis 4	The direct effect of institutional managerial holdings on performance is larger for group firms than for non-group firms. Conversely, the direct effect of individual managerial holdings on performance is larger for non-group firms than for group firms.	$\gamma_{35} < 0, \gamma_{36} > 0$
Hypothesis 5	For both group and non-group firms, there exists asymmetric substitution between individual and institutional managerial holdings. Substitution of individual for institutional holdings is stronger than that of institutional for individual ones. However, the degree of asymmetric substitution is larger for non-group firms than for group firms.	$\gamma_{21} < \gamma_{11}, \gamma_{21} + \gamma_{29} < \gamma_{11} + \gamma_{19},$ $(\gamma_{11} + \gamma_{19}) - (\gamma_{21} + \gamma_{29}) < (\gamma_{11} - \gamma_{21})$ $\Rightarrow \gamma_{29} > \gamma_{19}$
Hypothesis 6	The degree to which institutional managerial holdings can be replaced by individual ones is lower for group firms than for non-group firms. Conversely, the degree to which individual managerial holdings can be replaced by institutional ones is lower for non-group firms than for group firms.	$\gamma_{29} > 0, \gamma_{19} < 0$
Hypothesis 7	For both group and non-group firms, how the indirect effects derived from the substitution between individual and institutional managerial holdings change their respective direct effects requires empirical investigations.	$\gamma_{31} + (\gamma_{32} \cdot \gamma_{11}) = ?,$ $\gamma_{32} + (\gamma_{31} \cdot \gamma_{21}) = ?,$ $(\gamma_{31} + \gamma_{35}) + (\gamma_{32} + \gamma_{36}) \cdot (\gamma_{11} + \gamma_{19}) = ?,$ $(\gamma_{32} + \gamma_{36}) + (\gamma_{31} + \gamma_{35}) \cdot (\gamma_{21} + \gamma_{29}) = ?$

Table II. Summary Statistics

istics for the variables used in the regression models. Q is defined as the ratio of the value of the firm to the replacement value of assets. value of common equity plus the market value of preferred stock plus the book value of total liabilities, and for the replacement value of total assets. MH, MH-IND, MH-INST represent the percentage of the firm's common equity held by total managers, individual managers respectively. SIZE is the logarithm of the annual book value of assets; AGE is the logarithm of the number of years since the firm is estimated as the standard deviation of the firm's weekly stock market rates of return; ADV is the ratio of annual advertising expenditures to annual sales; FIX is the ratio of annual expenditures on plant and equipment to total assets; DEBT is the ratio of annual book value of debt to total assets. The sample is 229 non-financial companies listed on the Taiwan Stock Exchange data over the period 1995–2000. The whole data panel is thus balanced and includes 1374 observations for 229 firms. The status of firms may change over time. Of 1374 observations, 741 are classified as group firms.

Panel A. Descriptive Statistics for Variables Used in the Models

II Firms (N=1374)			Group Firms (N=741)			Non-Group Firms (N=633)				
Std.	Min.	Max.	Mean	Std.	Min.	Max.	Mean	Std.	Min.	Max.
0.8172	0.0372	6.4913	1.1949 ***	0.7237	0.0658	4.9670	1.4496	0.8959	0.0372	6.4913
0.1361	0.0075	0.8242	0.2374 *	0.1447	0.0478	0.8187	0.2235	0.1249	0.0075	0.8242
0.1114	0.0000	0.7056	0.0835 ***	0.1021	0.0000	0.5473	0.1227	0.1181	0.0000	0.7056
0.1489	0.0000	0.8241	0.1539 ***	0.1622	0.0000	0.8186	0.1008	0.1259	0.0000	0.8241
1.0519	13.3731	19.2476	16.4227 ***	1.0067	13.7936	19.2476	15.3718	0.7879	13.3731	18.9117
0.2879	2.4849	4.0775	3.5326 ***	0.2879	2.5650	4.0775	3.4554	0.2824	2.4849	4.0254
0.0215	0.0047	0.2008	0.0591 ***	0.0198	0.0222	0.1341	0.0639	0.0231	0.0047	0.2008
0.0214	0.0000	0.3454	0.0081	0.0201	0.0000	0.3454	0.0080	0.0228	0.0000	0.2121
0.0146	0.0000	0.1449	0.0071	0.0128	0.0000	0.0946	0.0078	0.0165	0.0000	0.1449
0.7491	0.0000	6.2327	0.7350	0.6549	0.0000	5.5895	0.7921	0.8456	0.0015	6.2327
0.0714	0.0000	0.6433	0.0787 ***	0.0560	0.0000	0.4487	0.0910	0.0856	0.0000	0.6433

Panel B. Mean Values of Managerial Ownership and Tobin's Q, 1995–2000

	1995	1996	1997	1998	1999	2000
Q	0.2612	0.2467	0.2352	0.2231	0.2134	0.2063
MH	0.1264	0.1145	0.1047	0.0955	0.0869	0.0813
MH-IND	0.1348	0.1322	0.1305	0.1276	0.1265	0.1249

.6480	1.4728	1.5455	1.3190	1.0561	0.8320
0.2541	0.2630	0.2520	0.2306	0.2211	0.2147
0.0935	0.0915	0.0859	0.0835	0.0773	0.0735
0.1606	0.1715	0.1661	0.1471	0.1438	0.1412
0.5251	1.3539	1.3779	1.2299	1.0351	0.7871
0.2671	0.2309	0.2189	0.2120	0.2020	0.1937
0.1537	0.1369	0.1230	0.1136	0.1013	0.0930
0.1134	0.0940	0.0959	0.0984	0.1007	0.1007
0.7503	1.5886	1.7087	1.4517	1.0874	0.8989

values are significantly different between group and non-group firms at the 0.10, and 0.01 significance level respectively. Mean with unequal variances.

Estimated Coefficients for Total Managerial Ownership and Firm Performance Equations

A model is estimated for the regression (1) – (3) using 2SLS methodology:

$$ZE_{it} + \beta_{13}AGE_{it} + \beta_{14}RISK_{it} + \beta_{15}RISK_{it}^2 + \beta_{16}DEBT_{it} + \beta_{17}GROUP_{it} + \beta_{18}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it}$$

$$DV_{it} + \beta_{23}R\&D_{it} + \beta_{24}FIX_{it} + \beta_{25}DEBT_{it} + \beta_{26}GROUP_{it} + \beta_{27}(MH_{it} \times GROUP_{it}) + \varepsilon_{2it}$$

Common equity held by all managers. Q is the ratio of the value of the firm to the replacement value of assets. For firm value, I use the market value of preferred stock plus the book value of total liabilities, and for the replacement value of assets I use the book value of the annual book value of assets; AGE is the logarithm of the number of years since the firm's first incorporation; RISK is estimated as weekly stock market rates of return; RISK² is the squared value of RISK; DEBT is the ratio of annual book value of debt to total assets; R&D is the ratio of annual research and development expenditures to annual sales; FIX is the ratio of capital expenditures to annual sales; and GROUP is a dummy variable, which is equal to one if the firm is affiliated to business groups. The H and Q are also included in the regressions. In the regression (3'), additional terms that interact GROUP with RISK, RISK², DEBT, and DEBT² are included. The sample consists of 1,000 non-financial companies listed on the Taiwan Stock Exchange in 1994 and had no missing data during 1995–2000. The regression (1) uses a fixed-effects model (with an intercept); the regression (2) controls unobserved firm heterogeneity only (α_i is the individual-specific intercept and $\mu = \delta_t = 0$); and the regression (3) controls unobserved firm heterogeneity and period effects (α_i , δ_t , and μ are all required). At the bottom of panel A, I also report the effects of Q, RISK, and DEBT, and the coefficients of themselves and their interaction terms with GROUP. Similarly, at the bottom of panel B, the effects of MH and DEBT are reported. The estimated results of α_i and δ_t are not reported in the table.

Panel A. MH Equation

(1) Pooled	(2) Firm Effects	(3) Firm and Period Effects	(3') Firm and Period Effects
0.4314 (5.349)***		1.3367 (4.796)***	1.4565 (4.903)***
0.0330 (4.184)***	-0.0198 (-1.532)	-0.0230 (-1.766)*	-0.0364 (-2.287)**
0.0022 (0.526)	0.0013 (0.169)	0.0042 (0.552)	0.0001 (0.019)
-0.0748 (-5.794)***	-0.3632 (-5.598)***	-0.3293 (-3.931)***	-0.3301 (-3.797)***
-0.3916 (-0.617)	0.6172 (2.098)**	0.6931 (2.158)**	0.0550 (0.148)
-3.3669 (-0.786)	-5.0805 (-2.662)***	-5.8158 (-2.874)***	-3.0372 (-1.328)
0.1109 (2.048)**	-0.0409 (-0.602)	-0.0430 (-0.639)	-0.1275 (-1.556)
0.0284 (1.614)	-0.0377 (-2.403)**	-0.0383 (-2.447)**	-0.1504 (-4.196)***
-0.0047 (-0.400)	0.0245 (2.207)**	0.0254 (2.294)**	0.0496 (3.067)***
			1.7454 (2.879)***
			-9.0834 (-2.209)**
			0.1672 (2.009)**

0.0801	0.8921	0.8963	0.8974
0.0283 ($p = 0.0006$)	0.0047 ($p = 0.7129$)	0.0024 ($p = 0.8549$)	0.0132 ($p = 0.3265$)
			1.8004 ($p = 0.0008$)
			0.0397 ($p = 0.6050$)

Panel B. Q Equation

(1) Pooled	(2) Firm Effects	(3) Firm and Period Effects	(3') Firm and Period Effects
0.8155 (11.050) ^{***}		2.2802 (7.101) ^{***}	2.3252 (6.644) ^{***}
1.9396 (7.080) ^{***}	9.9319 (9.430) ^{***}	-4.3128 (-3.357) ^{***}	-4.4437 (-3.298) ^{***}
-1.9725 (-2.013) ^{**}	-0.1908 (-0.113)	-0.3271 (-0.299)	-0.3481 (-0.317)
14.0601 (9.786) ^{***}	-0.6617 (-0.173)	2.6399 (1.061)	2.6995 (1.081)
-0.0469 (-1.654) [*]	-0.1198 (-1.253)	-0.2477 (-3.923) ^{***}	-0.2501 (-3.932) ^{***}
1.5803 (5.336) ^{***}	1.9490 (1.974) ^{**}	1.9435 (3.008) ^{***}	1.7859 (2.207) ^{**}
0.0542 (0.592)	-0.3359 (-1.096)	0.2767 (1.365)	0.2827 (1.389)
-1.3039 (-3.627) ^{***}	1.9204 (1.489)	-0.8863 (-1.035)	-1.0122 (-1.076)
			0.3085 (0.324)
0.1491	0.2982	0.7072	0.7070
0.6357 ($p = 0.0022$)	11.8523 ($p < 0.0001$)	-5.1991 ($p = 0.0006$)	-5.4559 ($p = 0.0014$)
			2.0944 ($p = 0.0087$)

* denote significance at the 0.10, 0.05, and 0.01 levels respectively.

Table IV. Estimated Coefficients for Individual Managerial Ownership, Institutional Managerial Ownership, and Firm Performance Equations

This table shows the estimated results of the following simultaneous equation model using 2SLS methodology:

$$\text{MH-IND}_{it} = \mu_1 + \alpha_{1i} + \delta_{1i} + \gamma_{11}\text{MH-INST}_{it} + \gamma_{12}\text{Q}_{it} + \gamma_{13}\text{SIZE}_{it} + \gamma_{14}\text{AGE}_{it} + \gamma_{15}\text{RISK}_{it} + \gamma_{16}\text{RISK}_{it}^2 + \gamma_{17}\text{DEBT}_{it} + \gamma_{18}\text{GROUP}_{it} + \gamma_{19}(\text{MH-INST}_{it} \times \text{GROUP}_{it}) + \gamma_{110}(\text{Q}_{it} \times \text{GROUP}_{it}) + \varepsilon_{1it}$$

$$\text{MH-INST}_{it} = \mu_2 + \alpha_{2i} + \delta_{2i} + \gamma_{21}\text{MH-IND}_{it} + \gamma_{22}\text{Q}_{it} + \gamma_{23}\text{SIZE}_{it} + \gamma_{24}\text{AGE}_{it} + \gamma_{25}\text{RISK}_{it} + \gamma_{26}\text{RISK}_{it}^2 + \gamma_{27}\text{DEBT}_{it} + \gamma_{28}\text{GROUP}_{it} + \gamma_{29}(\text{MH-IND}_{it} \times \text{GROUP}_{it}) + \gamma_{210}(\text{Q}_{it} \times \text{GROUP}_{it}) + \varepsilon_{2it}$$

$$\text{Q}_{it} = \mu_3 + \alpha_{3i} + \delta_{3i} + \gamma_{31}\text{MH-INST}_{it} + \gamma_{32}\text{MH-IND}_{it} + \gamma_{33}\text{DEBT}_{it} + \gamma_{34}\text{GROUP}_{it} + \gamma_{35}(\text{MH-INST}_{it} \times \text{GROUP}_{it}) + \gamma_{36}(\text{MH-IND}_{it} \times \text{GROUP}_{it}) + \gamma_{37}\text{ADV}_{it} + \gamma_{38}\text{R\&D}_{it} + \gamma_{39}\text{FIX}_{it} + \varepsilon_{3it}$$

MH-IND and MH-INST represent the percentage of the firm's common equity held by individual and institutional managers respectively. Q is the ratio of the value of the firm to the replacement value of assets. For firm value, I use the market value of common equity plus the market value of preferred stock plus the book value of total liabilities, and for the replacement value of assets I use the book value of total assets. SIZE is the logarithm of the annual book value of assets; AGE is the logarithm of the number of years since the firm's first incorporation; RISK is estimated as the standard deviation of the firm's weekly stock market rates of return; RISK² is the squared value of RISK; DEBT is the ratio of annual book value of debt to total assets; ADV is the ratio of annual advertising expenditures to annual sales; R&D is the ratio of annual research and development expenditures to annual sales; FIX is the ratio of annual expenditures on plant and equipment to annual sales; and GROUP is a dummy variable, which is equal to one if the firm is affiliated to business groups. The interaction terms of GROUP with MH-IND, MH-INST, and Q are added to the regressions. The sample is 229 non-financial companies listed on the Taiwan Stock Exchange in 1994 and had no missing data during 1995–2000. The effects of MH-INST, MH-IND, and Q for group firms are reported at the bottom. The estimated results of α_i and δ_i are not reported in the table.

	MH-IND Equation	MH-INST Equation	Q Equation
Constant (μ)	1.0069 (4.867)***	2.3411 (5.030)***	3.1048 (7.235)***
MH-INST	-0.3764 (-2.584)***		-8.1211 (-4.090)***
MH-IND		-1.9204 (-4.587)***	-6.0621 (-3.427)***
Q	0.0017 (0.170)	0.0102 (0.658)	
SIZE	0.0035 (0.637)	0.0289 (2.943)***	
AGE	-0.2588 (-4.425)***	-0.7033 (-4.630)***	
RISK	0.1662 (0.695)	0.1833 (0.581)	
RISK ²	-2.1795 (-1.411)	-2.5646 (-1.324)	
DEBT	-0.0768 (-1.647)*	-0.1820 (-2.343)**	1.8264 (2.817)***
GROUP	0.0274 (1.849)*	-0.0309 (-1.705)*	0.1408 (0.674)
MH-INST×GROUP	-0.1656 (-1.949)*		-3.2496 (-2.735)***
MH-IND×GROUP		1.2023 (4.222)***	2.1390 (1.584)
Q×GROUP	-0.0072 (-0.643)	-0.0846 (-2.616)***	
ADV			-0.5330 (-0.487)
R&D			4.3741 (1.650)*
FIX			-0.2768 (-4.341)***
Adj. R ²	0.9271	0.9311	0.7088
The Effect of MH-INST for Group Firms	$\gamma_{11} + \gamma_{19} = -0.5420$ ($p = 0.0072$)		$\gamma_{31} + \gamma_{35} = -11.3707$ ($p < 0.0001$)
The Effect of MH-IND for Group Firms		$\gamma_{21} + \gamma_{29} = -0.7181$ ($p = 0.0015$)	$\gamma_{32} + \gamma_{36} = -3.9231$ ($p = 0.0388$)
The Effect of Q for Group Firms	$\gamma_{12} + \gamma_{110} = -0.0055$ ($p = 0.5730$)	$\gamma_{22} + \gamma_{210} = -0.0744$ ($p = 0.0017$)	

t-statistics are in parentheses. *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.

Table V. Summary for the Relation between Ownership of Individual and Institutional Managers and Firm Performance

This table uses the estimated results of the following simultaneous equation model (the results of Table IV):

$$MH-IND_{it} = \mu_1 + \alpha_{1i} + \delta_{1t} + \gamma_{11}MH-INST_{it} + \gamma_{12}Q_{it} + \gamma_{13}SIZE_{it} + \gamma_{14}AGE_{it} + \gamma_{15}RISK_{it} + \gamma_{16}RISK_{it}^2 + \gamma_{17}DEBT_{it} + \gamma_{18}GROUP_{it} + \gamma_{19}(MH-INST_{it} \times GROUP_{it}) + \gamma_{110}(Q_{it} \times GROUP_{it}) + \varepsilon_{1it},$$

$$MH-INST_{it} = \mu_2 + \alpha_{2i} + \delta_{2t} + \gamma_{21}MH-IND_{it} + \gamma_{22}Q_{it} + \gamma_{23}SIZE_{it} + \gamma_{24}AGE_{it} + \gamma_{25}RISK_{it} + \gamma_{26}RISK_{it}^2 + \gamma_{27}DEBT_{it} + \gamma_{28}GROUP_{it} + \gamma_{29}(MH-IND_{it} \times GROUP_{it}) + \gamma_{210}(Q_{it} \times GROUP_{it}) + \varepsilon_{2it},$$

$$Q_{it} = \mu_3 + \alpha_{3i} + \delta_{3t} + \gamma_{31}MH-INST_{it} + \gamma_{32}MH-IND_{it} + \gamma_{33}DEBT_{it} + \gamma_{34}GROUP_{it} + \gamma_{35}(MH-INST_{it} \times GROUP_{it}) + \gamma_{36}(MH-IND_{it} \times GROUP_{it}) + \gamma_{37}ADV_{it} + \gamma_{38}R\&D_{it} + \gamma_{39}FIX_{it} + \varepsilon_{3it},$$

to report direct effects, indirect effects, which are derived from the substitution between shareholdings of individual and institutional managers, and total effects, which add up the direct and indirect effects, in four categories: Q's effect on MH-IND, Q's effect on MH-INST, MH-IND's effect on Q, and MH-INST's effect on Q. MH-IND and MH-INST represent the percentage of the firm's common equity held by individual managers and institutional managers respectively. Q is the ratio of the value of the firm to the replacement value of assets. For firm value, I use the market value of common equity plus the market value of preferred stock plus the book value of total liabilities, and for the replacement value of assets I use the book value of total assets. SIZE is the logarithm of the annual book value of assets; AGE is the logarithm of the number of years since the firm's first incorporation; RISK is estimated as the standard deviation of the firm's weekly stock market rates of return; RISK² is the squared value of RISK; DEBT is the ratio of annual book value of debt to total assets; ADV is the ratio of annual advertising expenditures to annual sales; R&D is the ratio of annual research and development expenditures to annual sales; FIX is the ratio of annual expenditures on plant and equipment to annual sales; and GROUP is a dummy variable, which is equal to one if the firm is affiliated to business groups. The interaction terms of GROUP with MH-IND, MH-INST, and Q are added to the regressions. The sample is 229 non-financial companies listed on the Taiwan Stock Exchange in 1994 and had no missing data during 1995–2000. Significance levels can be obtained from Table IV. Numbers in the parentheses of Total Effect are the total effects when the insignificant direct and indirect effects are replaced by zero.

	Direct Effect	Indirect Effect	Total Effect
<i>Q's Effect on MH-IND:</i>			
Non-Group Firms	$\frac{\gamma_{12}}{0.0017}$	$\frac{\gamma_{11} \cdot \gamma_{22}}{(-0.3764)^{***} \cdot (0.0102)}$	-0.0021 (0)
Group Firms	$\frac{\gamma_{12} + \gamma_{110}}{-0.0055}$	$\frac{(\gamma_{11} + \gamma_{19}) \cdot (\gamma_{22} + \gamma_{210})}{(-0.5420)^{***} \cdot (-0.0744)^{***}}$	0.0348 (0.0403)
<i>Q's Effect on MH-INST:</i>			
Non-Group firms	$\frac{\gamma_{22}}{0.0102}$	$\frac{\gamma_{21} \cdot \gamma_{12}}{(-1.9204)^{***} \cdot (0.0017)}$	0.0069 (0)
Group Firms	$\frac{\gamma_{22} + \gamma_{210}}{-0.0744^{***}}$	$\frac{(\gamma_{21} + \gamma_{29}) \cdot (\gamma_{12} + \gamma_{110})}{(-0.7181)^{***} \cdot (-0.0055)}$	-0.0705 (-0.0744)
<i>MH-IND's Effect on Q:</i>			
Non-Group Firms	$\frac{\gamma_{32}}{-6.0621^{***}}$	$\frac{\gamma_{31} \cdot \gamma_{21}}{(-8.1211)^{***} \cdot (-1.9204)^{***}}$	9.5337
Group Firms	$\frac{\gamma_{32} + \gamma_{36}}{-3.9231^{***}}$	$\frac{(\gamma_{31} + \gamma_{35}) \cdot (\gamma_{21} + \gamma_{29})}{(-11.3707)^{***} \cdot (-0.7181)^{***}}$	4.2422
<i>MH-INST's Effect on Q:</i>			
Non-Group Firms	$\frac{\gamma_{31}}{-8.1211^{***}}$	$\frac{\gamma_{32} \cdot \gamma_{11}}{(-6.0621)^{***} \cdot (-0.3764)^{***}}$	-5.8393
Group Firms	$\frac{\gamma_{31} + \gamma_{35}}{-11.3707^{***}}$	$\frac{(\gamma_{32} + \gamma_{36}) \cdot (\gamma_{11} + \gamma_{19})}{(-3.9231)^{***} \cdot (-0.5420)^{***}}$	-9.2444

*, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively