# Chapter IV
# Empirical Results

This chapter exhibits the empirical results and attempts to answer of all hypotheses of the determinants of board structure in family, non family, and Thai firms in the sample. There are three hypotheses formed to ask about the different determinants of three board structures, which are board size, proportion of independent directors, and CEO dual role, in family and nonfamily firms. The empirical results of the determinants of board structure of all Thai sample data, family firm, and non family firm are shown in Table 5-7.

## 4.1 Determinant of board structure in Thailand

The determinants of board structures are caused from the scope of operation and the tradeoff between the monitoring benefit and cost. Boone, Field, Karpoff, and Raheja (2007) has shown that scope of operation is positively related to board size and proportion of independent directors, high monitoring cost is negatively related to board size and proportion of independent directors, and high private benefit is positively related to board size and proportion of independent directors. Nevertheless, the difference corporate governance between Thailand and other developed countries, I expect the results of the determinants of board structure are different.

The study conducts the multiple regression models of board size and proportion. The regressions are Ordinary Least Square (OLS) and Weighted Least Square (GLS) with White estimator. The study uses firm size, firm age, number of business segment, and leverage as the measures of the scope and complexity of a firm's operation. The scope of operation hypothesis predicts that board size and the proportion of independent director are positively related to these four measures. This implies that as companies are growing, board grows in response of the increasing in net benefits of monitoring and specialization by board member. I use the free cash flow as measure of the private benefits available to insiders (high agency problem). It is expected to be positively related to board size and proportion of independent directors as it represents the monitoring benefit to control for the agency problem. The cost of monitoring is negatively related

to board size and proportion of independence directors. The proxies of monitoring cost are the market to book, stock variance, and CEO ownership.

The results of board size and proportion of independent directors reported in Table 5. In Table 5A, the number of directors on the board is the dependent variable. In Column 1, represents the OLS regressions using all sample data. The measure of firm size and firm age are positively and significantly related to board size, which consistence with the scope of operation theory. While number of business segment and leverage are not significant. Free cash flow is positively and strongly significant to board size, which is as expected. Market to book and CEO ownership are negatively and significantly related to board size as the prediction of the monitoring cost theory. Nevertheless, the stock variance is not statistically significant to board size. The result shows that board size of Thai firms are positively related to scope of operation and agency problem variables while it is negatively related to monitoring cost, which aligns with the study aboard.

The determinants of board independence from Thai sample are shown in Table 5B. From the result in Column 1, firm size, leverage, market to book, and stock variance are statistically significant to the proportion of independent directors. Board independence is positively related to firm size (at the 1% significant level) and leverage (at 10% significant level). Board independence is negative related to market to book (at 5% significant level, and stock variance (at 1% significant level). This implies that proportion of independent directors increase with the benefit of more information need for operation as the firms grow larger. In the high monitoring cost firm the proportion of independent should be smaller as the predicted. However, the proportion of independence is not significantly related to the proxy of agency problem. This shows that Thai firms do not give much importance on monitoring duty of the board independent.

As the result, the board size determinants of Thai firms aligned with the study of Boone, Field, Karpoff, and Raheja (2007) Nevertheless, the board independence determinants do not show the same results with the foreign studies. Thailand has different corporate governance on the proportion of independent directors. The negative lag (independence) in Table 5A and lag (board size) in Table 5B implies that the board size is negatively related to proportion of independent directors. It is because majority of Thai firms have only three independent directors which is set to

meet the requirement of the Stock Exchange of Thailand. Thus, when the board size is increasing and the number of independent director is fixed, the proportion of independent director become smaller.

## 4.2 Family firm have smaller board size than nonfamily firm

In this study, family firms are both founding and nonfounding family firm. Founding family firm defined if the founder or a member of his or her family by either blood or marriage is a director, or the owner of at least 5% of the firm's equity, either individually or as a group. Non founding family firm defined when more than one person with same surname or related by blood or marriage collectively hold more than 25% of the equity, the company will be defined as non founding family firm. Alternatively, if more than one person with the same surname or related by blood or marriage collectively hold more than 10% of the equity and at least one family member has a position on the board of director. Nonfamily firm is the firm that is not family firm, government controlled firms, and institutional controlled firms. Family firm and nonfamily firm characteristic are different as I have discussed in chapter 2 in detail. Hence, I expect that family firm board size should be smaller with less proportion of independent directors because family firm need less monitoring from outsider. Nevertheless, the mean of family firm's board size is larger than nonfamily firm by 0.66, the t-stat of the different in mean is 4.88, which is statistically significant. Empirical data shows that family firm does not have smaller board size than nonfamily firm, which contradicts with our hypothesis.

Table 5A shows the determinants of family and nonfamily board size in the Column 3-6. Scope of operation variables such as firm size and firm age are statistically and positively significant (significant at 1% level) to board size in family and nonfamily firm. However, the impact of scope operation to board size is larger in family firm than in nonfamily firm. It implies that family firm needs more advisory from board of directors than nonfamily firm. Free cash flow is both significant to board size in both samples. However, free cash flow has larger impact on board size in nonfamily firms (coefficient = 1.799, significant at 5% level) while it has smaller impact in family firm (coefficient = 1.173, significant at 5% level). This implies that family firm needs less monitoring for agency problem than nonfamily firm. Moreover, the results of other variables used

to test monitoring cost show that family firm need less monitoring than nonfamily firm. Market to book is negatively related to board size in family firm at 1% significant level, while it is insignificantly related in nonfamily firm sample. Board size is negatively and significantly related to CEO ownership in family and nonfamily firm. This is evidence that show the higher monitoring cost in family firm than nonfamily firm.

In government controlled sample, board size is positively and significantly related to firm size; the coefficient is 1.106 (significant at 1% level). The market to book is negatively and significantly related to board size of 1.881. It shows that government controlled firms' board size is significantly impacted from the scope of operation.

Board size of family firm is larger than nonfamily is because there is higher advising needs from board directors. Family firm has higher monitoring cost than nonfamily firm and family need less control for agency problem than nonfamily firm. Government controlled and institutional controlled firms' board sizes are statistically significant affected by the scope of operation variables.

## 4.3 Family firms have less proportion of independent director than the nonfamily firms

Family firm has lower agency problem than other firms because it has an align benefit of management and shareholder. Because family firm trust play important role in the company and the monitoring cost is higher in family firm, there is less need of monitoring the management team. Family firms are expected to have less proportion of independent directors than nonfamily firm.

It shows empirically that family firms have the same proportion of independent directors as nonfamily firms. The difference in mean of proportion of outsider between family and nonfamily firm is zero, and it is statistically insignificant. The means of both firms also equals to the sample mean. Thus, it shows that most of Thai firm has proportion of insiders about 32 percents of the board size. This is level of proportion of board independence is much smaller than the foreign studies (Mishra, Randoy, and Jenssen (2001); Cheng (2008); Coles, Denial, and Naveen (2008)). This shows the different in corporate governance between Thailand and those developed countries.

Table 5B shows the determinants of proportion of independent directors between family firms and nonfamily firm. Family firm's proportion of independent is negatively and significantly related to stock variance at 1% significant level. The result implies that those family firms do not need advisory or monitoring helps from the independent directors. Free cash flow, which serves as a proxy for the benefit of monitoring for agency problem, does not significantly affect family firms' proportion of independent directors. However, nonfamily firm panel shows different results. Not only stock variance is negatively significant, the coefficients for number of segment and free cash flow show the positive signs at 5% significant levels.

Thus, nonfamily firms' board independent is positively related with scope of operation and benefit of monitoring variables. Moreover, there is evidence in government controlled firm that proportions of independent director are explained for the agency problem control purposes. Government controlled firm is positively related to stock variance, which is different from other types of firms. This implies that independent directors in government controlled firm have strong monitoring roles. Thus, when even there is high monitoring cost, the firm would require higher proportion of independent directors.

The differences in determinants of proportion of independent directors prove that family firm need less monitoring from the board independence than other types of firms. On the other hands, from empirically finding, the identity means of proportion of independent between family and nonfamily firms come from the corporate governance of Thai firms. The numbers of independent directors are set just qualified to the corporate governance standard of the Security Exchange Committee. With this practice, the average number of independent directors of the two samples is very similar.

Thus, although the determinants of the proportion of independent director between family and nonfamily are differently constructed, the proper the proportion of independent directors have not been practice. The result is that nonfamily firm, which has higher agency problem, does not increase their proportion of independent directors.

## 4.4 Robustness

To check the robustness of the result, the GLS regressions have been run on the board size and proportion of independent directors. As reported in Table 6A, the column 1 shows that firm size, firm age, number of segment and leverage are positively and significantly to board size at 1% significant level. Free cash flow is also positively related to board size at 1% significant level. Monitoring cost variables, which are market to book and CEO ownership, are negatively related to board size at 1% significant level. The adjusted R squared of this model is 0.74, which is high. Board size determinants of family and nonfamily firm in shows the same results that family firm need less the monitoring function of board than nonfamily firm. Market to book, stock variance, and CEO ownership are significantly and negatively related to board size only in family firm. Nonfamily requires higher board size to monitoring management team for the agency problem (larger coefficient of free cash flow than family firm).

Table 6B shows the GLS regression on the proportion of independent director. In Panel 1, the scope of operation variables are significantly and positively related to board independent at 1% significant level, which are aligned with our hypotheses. Free cash flow is also positively related to the dependent variable. Monitoring cost variables are negatively related to proportion of independent at 1% significant level.

From the structural break test using Chow test, it show that each coefficients in each sample are significantly different from the all sample regression. Wald tests have been conducted to test the different in coefficients among free cash flow and firm size variables in family, nonfamily, government controlled, and institutional controlled firms, which the result shows that they are significantly different.

## 4.5 The magnitude of impacts on board size and independence

The results indicate that board size and independence depend on proxies for the firms' characteristic in terms of scope of operation, and the opportunities for private benefits, and the cost

of monitoring managers. This section shows how large these effects are to board size and proportion of independence in different types of firm.

The coefficients OLS estimated in Table 5 are employed to fit value for board size and the proportion of independent directors. For each regressor that is significantly related to board size or independence, I perturb that regressor by one standard deviation and leave all regressor at their mean values. This way I calculate the predicted change for the dependent variables. The results are presented in Table7. One-standard deviation increase in firm size predicts a 0.82 increase in the number of board members while firm age predicted 0.28. The scope of operation variables has the largest impact on board size. Among the sample, scope of operation has the largest effect on family firm. While one standard deviation increase in free cash flow is associated with increase in board size of 0.216 in the nonfamily firm, the proxies for monitoring cost have no impact on nonfamily firm's board size. Government controlled firms and institutional controlled firms' board sizes are heavily impacted by the firm size.

For proportion of independent director, one standard deviation increase in firm size has larger impact to nonfamily firm than family firms, which increase 1.5% for family firms and 1.3% for nonfamily firms. Moreover, free cash flow is predicted to have 0.69% increase to the proportion of independent director in nonfamily while it is not significant in regression for family firm. Family firm's proportions of independence director are reduced by the cost of monitoring variables, which are market to book and stock variance heavily while this impact is smaller in nonfamily firms.

Comparing these results with Boone, Field, Karpoff, and Raheja (2007), it shows that sample of Thai data's board size have large impact from both firm size and firm age, which align with their finding. However, the impacts the proportions of independent directors have the different result. From their finding all the scope of operation variables has the impact by more than 1.33% while in Thailand only firm size impacts the proportion of independent directors.

Overall, these results indicate that many factors that contribute to board size and board independence are different across characteristic of firms. Scopes of operation variables have the

largest impact to family firm's board size while nonfamily firms' board sizes have been impacted the largest from agency problem controlled variables.

Board independence in family firm is impacted negatively by the monitoring cost variables, and it is insignificantly impacted by free cash flow. From these results, the family firms' proportions of independence have been impacted more negatively and smaller from explained variables.

### 4.5 CEOs of family firms have dual role more than those of nonfamily firms

The chance of CEO who has the chairman of the board position in family firm should happen more often than in nonfamily firm. The dual role is viewed as the bad corporate governance practice from many critics. They perceived this position as the creation of agency problem that the management team has over power. Nevertheless, this position has brought the leadership into the firm. It reduces the time of decision process where one person can influence the end action of the meeting. The dual role will provide the CEO with more power and quicker decision making process. Family firms have special characteristic that trust play an important role in the operation. The family firms have low agency problem as they align incentive between shareholder and management team. Thus, dual role can be one tool that they should use to improve the firm performance.

Table 8 reported the logistic regression test on probability of dual role in family firm and nonfamily firm. It shows that CEO ownership in family firm is positively and significantly related to the dual role position at 1% significant level. In nonfamily firm sample, CEO ownership is negatively related to the dual role position, but it is insignificant. These results suggest that CEO of family firm tend to have dual role more than those of nonfamily firms. Thus, it implies the strong board leadership in family firms in Thailand.

Table 5
Test of the determinants of board size and independence using OLS.
Estimated coefficients are from multiple regressions using pooled data of 384 firms from the Stock Exchange of Thailand during 2003-2008. For the precise firm identification methods, please see in the Diagram 1. The dependent variable in Panel A is the number of board members. The dependent variable in Panel B is the proportion of the independence. Firm Size is the natural log of the market value of equity as of each fiscal year end. Firm Age is the number of years since incorporation until 2008. Number of Segment is the number of operating segment in the company. Leverage is the ratio of debt to total asset. Free Cash Flow is the ratio of operating cash flow less preferred and equity dividend payment to total asset. Market to Book is natural log of the book value of debt plus the market value of equity, divided by total asset. Stock Variance is the variance of the firm's monthly total return. CEO ownership is percentage of share hold by the CEO at the end of year. Lag (Independence) is the percent of independent directors on the board in previous year. Lag (Board Size) is the number of director on the board in the previous period. Lag (ROA) is the return on assets, measured as operating income over total assets in the previous year. Stand errors are computed using robust method (White estimator). $P$-values are given in parentheses, ***,**, and * indicate statistical significance at 1%,5%, and 10% levels, respectively. (a) None of government controlled firms have CEO ownership.

## Panel A. Number of board member as the dependent variable

|  | All Sample | Family Firms | Nonfamily Firms | Government Controlled | Institutional Controlled |
|---|---|---|---|---|---|
| **Scope of operations variables :** | | | | | |
| Firm Size | 0.493 | 0.578 | 0.282 | 1.106 | 0.724 |
|  | (0.000)*** | (0.000)*** | (0.012)** | (0.000)*** | (0.003)*** |
| Firm Age | 0.012 | 0.012 | 0.009 | 0.044 | 0.033 |
|  | (0.000)*** | (0.000)*** | (0.039)** | (0.005)*** | (0.017)** |
| Number of Segment | 0.065 | 0.009 | -0.468 | 0.125 | 1.492 |
|  | (0.471) | (0.927) | (0.048)** | (0.578) | (0.079)* |
| Leverage | 0.084 | 0.324 | -0.217 | -1.038 | 1.332 |
|  | (0.356) | (0.1945) | (0.256) | (0.397) | (0.435) |
| **Agency problem variable:** | | | | | |
| Free Cash Flow | 1.506 | 1.173 | 1.799 | 2.063 | -6.591 |
|  | (0.001)*** | (0.022)** | (0.036)** | (0.600) | (0.086)* |
| **Monitoring cost variables:** | | | | | |
| Market to Book | -1.019 | -1.475 | -0.114 | -1.881 | 0.057 |
|  | (0.000)*** | (0.000)*** | (0.697) | (0.009)*** | (0.544) |
| Stock Variance | 0.043 | 0.0451 | 0.045 | -20.367 | 0.149 |
|  | (0.266) | (0.352) | (0.775) | (0.373) | (0.225) |
| CEO Ownership | -0.026 | -0.033 | -0.056 | (a) | 0.016 |
|  | (0.000)*** | (0.000)*** | (0.359) |  | (0.943) |
| **Control Variables:** | | | | | |
| Lag(Independence) | -14.702 | -17.089 | -9.929 | -5.309 | -15.553 |
|  | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) |
| Lag(ROA) | 0.404 | 0.655 | 0.1629 | 0.793 | -1.961 |
|  | (0.007) | (0.000) | (0.506) | (0.383) | (0.036) |
| Constant | 4.698 | 3.845 | 7.781 | -11.862 | -3.372 |
| Adjusted $R^2$ | 0.361 | 0.443 | 0.251 | 0.686 | 0.616 |
| Observation | 1974 | 1399 | 464 | 52 | 59 |
| **F-statistic** | 110.884 | 81.712 | 15.172 | 10.186 | 7.68 |
| **(p-value)** | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |

**Panel B. Proportion of independent director as the dependent variable**

| | All Sample | Family Firms | Nonfamily Firms | Government Controlled | Institutional Controlled |
|---|---|---|---|---|---|
| **Scope of operations variables ::** | | | | | |
| Firm Size | 0.008 | 0.005 | 0.005 | 0.003 | 0.003 |
| | (0.009)** | (0.003)*** | (0.033)** | (0.007)*** | (0.030)*** |
| Firm Age | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 |
| | (0.483) | (0.002)*** | (0.106) | (0.69) | (0.659) |
| Number of Segment | 0.002 | 0.000 | 0.022 | -0.032 | 0.059 |
| | (0.751) | (0.933) | (0.002)*** | (0.421) | (0.033)** |
| Leverage | 0.009 | 0.015 | 0.005 | 0.125 | 0.068 |
| | (0.065)* | (0.097)* | (0.08)* | (0.267) | (0.255) |
| **Agency problem variables:** | | | | | |
| Free Cash Flow | 0.037 | 0.027 | 0.053 | 0.2254 | 0.196 |
| | (0.136) | (0.207) | (0.040)* | (0.002)*** | (0.194) |
| **Monitoring cost variables:** | | | | | |
| Market to Book | -0.015 | -0.003 | -0.004 | -0.006 | -0.028 |
| | (0.0387) | (0.000)*** | (0.632) | (0.888) | (0.169) |
| Stock Variance | -0.002 | -0.003 | -0.007 | 4.303 | 0.000 |
| | (0.000)*** | (0.000)*** | (0.031)** | (0.000)*** | (0.259) |
| CEO Ownership | 0.000 | 0.000 | 0.001 | (a) | 0.003 |
| | (0.637) | (0.943) | (0.548) | | (0.772) |
| **Control Variables:** | | | | | |
| Lag(Board size) | -0.017 | -0.016 | -0.016 | 0.000 | -0.018 |
| | (0.000) | (0.001) | (0.000) | (0.403) | (0.024) |
| Lag(ROA) | -0.006 | -0.002 | -0.0129 | -0.188 | 0.022 |
| | (0.104) | (0.699) | (0.112) | (0.000) | (0.185) |
| Constant | 0.339 | 0.415 | 0.349 | -0.373 | 0.309 |
| | (0.000) | (0.000) | (0.000) | (0.2166) | (0.031) |
| Adjusted $R^2$ | 0.307 | 0.392 | 0.265 | 0.333 | 0.378 |
| Observation | 1974 | 1399 | 464 | 52 | 59 |
| **F-statistic** | 86.960 | 89.62 | 16.362 | 109.163 | 2.92 |
| **(p-value)** | (0.000) | (0.000) | (0.000) | (0.000) | (0.006) |

Table 6
Test of the determinants of board size and independence using GLS.
  Estimated coefficients are from multiple regressions using pooled data of 384 firms from the Stock Exchange of Thailand during 2003-2008. For the precise identification methods, please see in the Diagram 1. The dependent variable in Panel A is the number of board members. The dependent variable in Panel B is the proportion of the independence. Firm Size is the natural log of the market value of equity as of each fiscal year end. Firm Age is the number of years since incorporation until 2008. Number of Segment is the number of operating segment in the company. Leverage is the ratio of debt to total asset. Free Cash Flow is the ratio of operating cash flow less preferred and equity dividend payment to total asset. Market to Book is natural log of the book value of debt plus the market value of equity, divided by total asset. Stock Variance is the variance of the firm's monthly total return. CEO ownership is percentage of share hold by the CEO at the end of year. Lag (Independence) is the percent of independent directors on the board in previous year. Lag (Board Size) is the number of director on the board in the previous period. Lag (ROA) is the return on assets, measured as operating income over total assets in the previous year. Stand errors are computed using robust method (White estimator). $P$-values are given in parentheses, ***,**, and * indicate statistical significance at 1%,5%, and 10% levels, respectively.
(a) None of government controlled firms have CEO ownership.

**Panel A. Number of board member as the dependent variable**

| | All Sample | Family Firms | Nonfamily Firms | Government Controlled | Institutional Controlled |
|---|---|---|---|---|---|
| **Scope of operations variables:** | | | | | |
| Firm Size | 0.489 | 0.552 | 0.351 | 1.177 | 0.291 |
| | (0.000)*** | (0.000)*** | (0.000)*** | (0.000)*** | (0.215) |
| Firm Age | 0.011 | 0.013 | 0.001 | 0.043 | 0.024 |
| | (0.000)*** | (0.000)*** | (0.000)*** | (0.000)*** | (0.000)** |
| Number of Segment | 0.130 | -0.008 | -0.366 | 0.225 | 1.373 |
| | (0.000)*** | (0.816) | (0.002)*** | (0.177) | (0.014)* |
| Leverage | -0.043 | 0.358 | -0.296 | -1.779 | 2.376 |
| | (0.609) | (0.012)** | (0.040)** | (0.144) | (0.068)* |
| **Agency problem variable:** | | | | | |
| Free Cash Flow | 1.029 | 0.997 | 1.697 | 1.415 | -2.911 |
| | (0.000)*** | (0.002)*** | (0.000)*** | (0.696) | (0.206) |
| **Monitoring cost variables:** | | | | | |
| Market to Book | -0.861 | -1.106 | -0.392 | -1.881 | 1.349 |
| | (0.000)*** | (0.000)*** | (0.031) | (0.003)*** | (0.048)** |
| Stock Variance | 0.028 | 0.065 | 0.161 | -25.491 | 0.101 |
| | (0.081)* | (0.081)* | (0.123) | (0.221) | (0.027)** |
| CEO Ownership | -0.022 | -0.027 | -0.034 | (a) | -0.006 |
| | (0.000)*** | (0.000)*** | (0.542) | | (0.873) |
| **Control Variables:** | | | | | |
| Lag(Independence) | -14.362 | -16.961 | -10.608 | -4.511 | -16.019 |
| | (0.000) | (0.000) | (0.000) | (0.003) | (0.000) |
| Lag(ROA) | 0.277 | 0.525 | 0.270 | 1.083 | -2.064 |
| | (0.000) | (0.000) | (0.189) | (0.158) | (0.002) |
| Constant | 4.605 | 4.133 | 6.205 | -13.633 | 6.004 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.198) |
| Adjusted $R^2$ | 0.742 | 0.715 | 0.409 | 0.703 | 0.666 |
| Observation | 1974 | 1399 | 464 | 52 | 59 |
| **F-statistic** | 568.96 | 352.81 | 33.165 | 14.381 | 9.587 |
| **(p-value)** | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |

| Panel B. Proportion of independent director as the dependent variable | | | | | |
|---|---|---|---|---|---|
| | All Sample | Family Firms | Nonfamily Firms | Government Controlled | Institutional Controlled |
| **Scope of operations variables:** | | | | | |
| Firm Size | 0.006 | 0.006 | 0.003 | 0.044 | 0.002 |
| | (0.000)*** | (0.000)*** | (0.044)** | (0.001)*** | (0.729) |
| Firm Age | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| | (0.000)*** | (0.000)*** | (0.983) | (0.259) | (0.002)*** |
| Number of Segment | 0.002 | -0.005 | 0.0253 | -0.042 | 0.029 |
| | (0.131) | (0.012)** | (0.000)*** | (0.196) | (0.098)* |
| Leverage | 0.008 | 0.016 | 0.107 | 0.125 | 0.056 |
| | (0.000)*** | (0.003)*** | (0.287) | (0.267) | (0.224) |
| **Agency problem variable:** | | | | | |
| Free Cash Flow | 0.032 | 0.013 | 0.017 | 0.096 | 0.085 |
| | (0.000)*** | (0.142) | (0.269) | (0.682) | (0.281) |
| **Monitoring cost variables:** | | | | | |
| Market to Book | -0.013 | -0.017 | -0.011 | 0.000 | -0.019 |
| | (0.000)*** | (0.000)*** | (0.004)*** | (0.666) | (0.094)* |
| Stock Variance | -0.002 | -0.002 | -0.005 | 0.000 | 0.000 |
| | (0.000)*** | (0.000)*** | (0.027)** | (0.000) | (0.522) |
| CEO Ownership | 0.000 | 0.000 | 0.000 | (a) | 0.000 |
| | (0.637) | (0.448) | (0.915) | | (0.405) |
| **Control Variables:** | | | | | |
| Lag(Board size) | -0.017 | 0.000 | -0.015 | -0.010 | -0.022 |
| | (0.000) | (0.000) | (0.000) | (0.217) | (0.000) |
| Lag(ROA) | -0.003 | 0.000 | -0.000 | -0.209 | 0.017 |
| | (0.008) | (0.386) | (0.094) | (0.000) | (0.148) |
| Constant | 0.382 | 0.397 | 0.376 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.052) | (0.001) |
| Adjusted $R^2$ | 0.798 | 0.754 | 0.519 | 0.333 | 0.487 |
| Observation | 1974 | 1399 | 464 | 52 | 59 |
| **F-statistic** | 784.859 | 425.47 | 51.07 | 6.632 | 6.505 |
| **(p-value)** | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |

Table 7
Economic impact of variables for the board size in each type firms
Specifically, coefficient estimates from Table 5 are used to fits values for board size and independence when all regressors are set at their mean values. I perturb each key explanatory variable by one standard deviation to calculate the predicted change in the dependent variable. The number indicate the effect of a one-standard deviation change in the explanatory variable on board size (number of board director at the year ended) or the proportion of independent board member ( ratio of total number of independent and audit directors to total number of board). (a) Coefficients are not significant in regression, so economic significance not computed.

**Panel A. Board Size (# of People)**

|  | All sample | Family firm | Nonfamily firm | Government Controlled | Institutional Controlled |
|---|---|---|---|---|---|
| **Tests of the Firm Scope of Operation** |  |  |  |  |  |
| Firm Size | 0.828 | 0.884 | 0.536 | 1.69 | 1.25 |
| Firm Age | 0.282 | 0.277 | 0.219 | 0.63 | 0.74 |
| **Tests of the agency problem** |  |  |  |  |  |
| Free cash flow | 0.166 | 0.126 | 0.216 | (a) | (a) |
| **Tests of the monitoring cost** |  |  |  |  |  |
| Market to Book | -0.537 | -0.775 | (a) | -0.282 | (a) |
| CEO Ownership | -0.296 | -0.426 | (a) | (a) | (a) |

**Panel B. Board Independence (Change in %)**

|  | All sample | Family firm | Nonfamily firm | Government Controlled | Institutional Controlled |
|---|---|---|---|---|---|
| **Tests of the Firm Scope of Operation** |  |  |  |  |  |
| Firm Size | 2.3% | 1.5% | 1.3% | 0.54% | 0.96% |
| **Tests of the agency problem** |  |  |  |  |  |
| Free cash flow | (a) | (a) | 0.69% | 1.5% | (a) |
| **Tests of the monitoring cost** |  |  |  |  |  |
| Market to Book | -0.79% | -0.16% | (a) | (a) | (a) |
| Stock Variance | -0.36% | -0.62% | -0.52% | 4.3% | 0.00 |

Table 8

The logistic regression test on probability of dual role in family firm

Estimated coefficients are from the logistic regressions using pooled data of 384 firms from the Stock Exchange of Thailand during 2003-2008. Family firms are the firm, which defined as founding family firm or non founding family firm. Nonfamily firms are firm that is not family, institutional controlled and government controlled firms. For the precise identification methods, please see in the diagram 1. CEO ownership is percentage of share hold by the CEO at the end of year. Firm Size is the natural log of the market value of equity as of each fiscal year end. Firm Age is the number of years since incorporation until 2008. Leverage is the ratio of debt to total asset. Stock Variance is the variance of the firm's monthly total return. Lag (ROA) is the return on assets, measured as operating income over total assets in the previous year. $P$-values are given in parentheses, ***,**, and * indicate statistical significance at 1%,5%, and 10% levels, respectively.

**Dummy dual role as the dependent variable**

|  | All Sample | Family firm | Nonfamily firm |
|---|---|---|---|
| CEO ownership | 0.0490 | 0.046 | 0.043 |
|  | (0.000)*** | (0.000)*** | (0.615) |
| Control Variable: |  |  |  |
| Firm Size | -0.025 | 0.016 | -0.083 |
|  | (0.399) | (0.71) | (0.056) |
| Firm Age | 0.000 | 0.002 | -0.002 |
|  | (0.820) | (0.531) | (0.719) |
| Lag ROA | -0.214 | -0.136 | -0.430 |
|  | (0.230) | (0.498) | (0.326) |
| Stock Variance | -0.040 | -0.035 | -2.914 |
|  | (0.350) | (0.394) | (0.511) |
| Constant | -1.522 | -2.299 | -0.239 |
|  | (0.019) | (0.012) | (0.798) |
| Observation | 2085 | 1466 | 506 |
| Obs with Dep=0 | 1749 | 1191 | 454 |
| Obs with Dep=1 | 336 | 275 | 52 |
| LR statistic | 129.613 | 139.795 | 6.099 |
| (Prob) | (0.000) | (0.000) | (0.29) |