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Corporate Governance and Corporate Investment: In terms of Strategic Management

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Abstract: *This research investigates how board composition influences corporate investment. This study considers the effect of board structure on R&D and examines the relationship between ownership configuration, board structure, R&D investment, and capital Investment. Also, I explore how the different board structures contribute to R&D and capital investment. The hypothesis was tested using panel analysis and logit analysis, utilizing a sample of Japanese electronics corporations for the financial years 2010-2014.While institutional investors affect corporations by promoting R&D and Capital investment, their influence on both investment is not addressed through outside directors dispatched by institutional investors. This study observed that boards composed of insiders avoid interference by institutional investors while they care about investor's interests.*
Keywords: *Corporate governance, Board of directors, R&D investment, Capital investment, Firm performance*

I. Introduction

Capital investments and specific R&D investments are essential elements of corporate strategy and growth. The role of a corporate board of directors, and by extension corporate governance, is to oversee this strategy and growth, with the goal of successful company performance. Many studies on this topic have suggested a relationship between firm performance and corporate governance (Bhagat &Bolton, 2008; Boone et al., 2007), as well as the effects of corporate governance on R&D and capital investment decisions (Atanassov, 2013; Barker III & Mueller, 2002). Zhang et al. (2014) successfully confirmed that corporate governance takes a mediating or moderating role in the relationship among R&D, capital investment, and firm performance. However, this previous research focuses on a general model of a corporate board and does not consider specific differences among styles of corporate boards (i.e., governance structures). The present study analyzes whether different corporate board styles have different effects on R&D and capital investments, as well as on firm performance.

Exposed to the global financial and consumer market after the mid-1990s, the Japanese corporate governance system has shifted to become oriented toward stockholder value. However, many companies have continued to use a conventional corporate governance system that emphasizes employee interests to retain skilled employees. The conventional system is still commonly utilized; however, some companies are aware of the changes in the global market and have created hybrid systems that combine governance elements from the United States and Japan.

This study examines how different corporate board styles moderate the relationships among R&D investment, capital investment, and firm performance. In addition, it explores whether there is a coherent system among corporate board styles, structures, and R&D and capital investment. The hypotheses are tested by analyzing samples of Japanese corporations from the 2010 to 2014fiscal years. The data were collected from the Nikkei database and corporate annual reports. The key variables utilized were return on assets (ROA) and the Tobin-Q, representing firm performance. Additionally, this study examines the relationship between corporate board style and firm performance, in terms both of accounting-based variables and external market valuations.

The results indicate that corporate board style and structure have some moderating effects on the relationship among R&D, capital investment, and firm performance. Partially coherent systems were observed among different board styles and R&D and capital investments. The findings provide insight into how different board styles can contribute to successfully generating corporate capabilities through R&D and capital investment.

II. Review Of Previous Studies

R&D and capital investment are essential for any corporate growth strategy. Previous studies have confirmed that corporate governance plays a mediating role in the relationship among R&D, capital investment, and firm performance. Baysinger and Hoskisson(1990) and Dong and Gou(2010) show that the proportion of outside directors should have a positive correlation with R&D investment. Generally, shareholders are assumed to take a risk-seeking attitude because they can diversify their own risk by investing in portfolios, while corporate managers cannot diversify their own risk because they retain their job or terminate their positions based on performance declines. This is sustained by agency theory, which focuses on the relationship between

the interests of the owner and those of the manager. R&D investments are intangible assets that typically do not increase the firm's total book assets. R&D projects are quite risky, in that R&D investment does not guarantee returns and the results of R&D investment and the future cash flow of R&D are uncertain. Agency theory assumes that corporate managers refrain from investing in R&D because the failure of R&D investment and following declining performance can jeopardize their position. Baysinger and Hoskinson(1989) find that shareholders and directors usually evaluate a manager's performance by financial goals, such as return on investment. The alignment of risk between shareholders and managers is realized by giving incentives like stock options to managers or forming a robust monitoring system with a board having an outside director. Osama(2008) revealed that independent directors constrain opportunistic R&D spending because independent directors have sufficient technical knowledge to identify opportunistic reductions in R&D.

On the other hand, capital investments bring about tangible assets that end up in balance sheets and increase total book assets. Capital investment is usually consumed for corporate growth and is expected to obtain returns in a certain way. In other words, capital investment is less risky than R&D. Capital investment is mainly composed of physical assets and would be appropriate to enhance a manager's discretion. A self-interested manager would invest in physical assets like property and plants. This behavior could reduce the risk of being terminated by shareholders, even if corporate performance is in decline. Also, it is motivated by an entrenchment motive and empire building among managers. Managerial conservatism would tend to promote overinvesting in capital investment, and the free cash flow problem is considered to be relevant in capital investment, in terms of agency theory. In accordance with the assumption of agency theory, Lu and Wang(2014) found that a firm with a more independent board makes lower capital investments and higher R&D investments.

Previous studies have taken general approaches to examine the relationship among ownership, board structure, and R&D and capital investment, but with inconclusive results. Also, corporate governance systems are diversified at the national level, and these studies did not consider different types of corporate boards and governance styles. This study examines the relationship among these factors, considering different styles of corporate boards in Japanese corporations.

III. Japanese Corporate Governance Style

The Japanese corporate governance system used to be characterized by block shareholding by corporations, financial institutions called "Mainbanks", and especially extensive inter-corporate shareholding. These kept the foreign shareholdings ratio low and caused outsider control to be absent in Japanese corporate governance. Hence, corporate boards were predominately composed of insiders.

Since the economic bubble burst in the early 1990s amid an economic recession, the value of cross-shareholding has decreased. Stable shareholding has declined, while foreign institutional share ownership has emerged. Corporations were exposed to strong market pressures and faced the need to strengthen vigilance and separate boards from management. In other words, the change in environment required corporations to secure board independence. However, while the new market-oriented role has forced a transformation in the Japanese governance system, Japan's conventional governance system remains embedded, leaving old strategies intact. As a coordinated economy, Japan is facing pressure for institutional change to create organizational diversity. Corporate governance models in Japan have been drastically transformed.

Corporate boards in Japanese corporations were predominantly composed of insiders who were promoted from lower levels of the corporation. Cross-shareholding and mainbank shareholding enabled Japanese corporations to not be exposed to outsider control, and top management did not need to consider stockholders' interest and could focus on corporate growth, in that they spent retained earnings on capital investments to enlarge the corporate business. Also, this enabled Japanese corporations to retain a long-term employment system, in which corporations invest in human resources and training for employees. Employees felt secured in their employment and were motivated to tackle the enhancing of service and product quality, which stimulated employees to contribute to the corporation and enhanced their psychological commitment to corporation. This corporate governance system is relevant to the Japanese strategic orientation, which concentrated on incremental innovations to emphasize firm-specific assets that are hard for competitors to imitate. Technology was formed in-house, and corporations pursued their own technologies with firm-specific skills. Corporations did not adopt outside resources or technology.

Since the late 1990s, after being exposed to market pressure followed by the emergence of foreign institutional investors, Japanese corporations faced the need to transform their corporate board styles, and some corporations with stock held by foreign investors have reformed their corporate governance system. In the transformed style of corporate governance, corporate boards adopted outsider and committee systems to enhance vigilance for protecting the interests of stockholders. Such corporations are under pressure by investors,who usually seek risk for management, and corporate managers are exposed to the same extent of risk.

However, corporate managers have feared that drastic reforms of corporate boards to adapt to the market could impair corporate value,which is considered to be generated by the long-term views of management

and incremental improvements among long-term employees. Several corporations have already adopted a committee system. Meanwhile, other corporations are generating a unique model to combine the inside-oriented model with a market-oriented model. To avoid adopting a committee system, such corporations divide board functions into monitoring and strategic implementation to separate the board organ into a corporate board and executive officers. Even though the officer system did not adopt a committee inside the corporate board and it is a hybrid model between a conventional Japanese governance model and the U.S. corporate governance model, which is oriented toward stockholders' value, the officer system is more shifted toward the market-oriented model and tries to embrace the stockholders' value and interests.

Corporate managers are required to do business in risk-taking ways and be aware of the stockholders' value. Risk-taking management leads corporations to focus on the short-term view and not to keep managing the status quo, forcing managers to change to conventional management practices. Corporate managers pursue risk-taking business rather than seeking corporate growth to spend money on capital investment. According to agency theory, in such a case, corporations are assumed to enhance their R&D investments because R&D investments are risky and not guaranteed to obtain future cash flow. Also, CEO's strong involvement in board processes could have detrimental effects on R&D investment, which could be promoted by boards with outsiders when corporations have a high ratio of foreign institutional investors.

IV. Hypothesis Development

Capital investments bring about tangible assets that end up in balance sheets and increase the total book assets. Meanwhile, R&D investments are intangible assets that typically do not increase a firm's total book assets. R&D projects are riskier than capital investments because of the uncertainty of future cash flows from R&D projects. Under agency theory, managers would heavily invest in property, plants, and equipment to control resources and secure their position. Managers would refrain from investing in risky R&D projects that could jeopardize their career.

According to agency theory, risk aversion among top management leads corporations to underinvest in R&D investments and overinvest in capital investments because risk-averse managers are considered to seek corporate growth, which may sometimes invite managerial perquisite consumption. A previous work (Lu &Wang,2015) revealed that the manager's pursuit of managerial rents creates a propensity to overinvest, but as long as managers take risk-averse behavior,they will show a propensity for underinvestment. Corporations tend to expand their physical assets, which are guaranteed to obtain cash flow, but are hesitant to invest in intangible assets like R&D investments. Due to the emergence of institutional investors, some corporations have been exposed to be the same extent of risk as institutional investors. As the organ to monitor management and the corporation, outside directors who are unaffiliated with insiders can enhance the vigilance of corporate boards and promote corporate managers to take risk-taking behavior.

In such a case, the high ratios of institutional investors and outsiders are assumed to promote corporate managers to spend on R&D investment. Institutional investors, as owners, benefit the most from risky investment. High-level institutional investment is assumed to promote a higher ratio of "outsiders" in board's composition and enhance board independence. The ratio of foreign institutional investors and board independence are assumed to promote R&D investment and decrease excessive capital investment. The high ratio of cross-shareholders could have a detrimental effect on R&D and a positive effect on capital investment. In other words, corporate board well-functioning could moderate overinvestment and underinvestment in both R&D and capital investment.

Hypothesis 1a: Institutional ownership is positively associated with R&D investment and negatively associated with capital investment.

Hypothesis 1b: There is a positive association between a high ratio of outsiders in a corporate board and R&D investment and a negative association between the ratio of outsiders and capital investment.

In the previous section, I categorized Japanese corporate boards into three types. Before 2014, among the three types of boards, the number of corporations adopting the committee system was very small because Japanese corporations feared that outsider directors may distort the corporate business, and it was difficult to hire outside directors due to the immaturity of the director market in Japan. Therefore, I have omitted the data regarding the committee system from this study due to a lack of data.

Also, I have to note that since 2015, an amendment of corporate law mandates that corporations listed in the Tokyo Stock Exchange must adopt outsiders in their corporate board and have an auditing committee, even though corporations explained reasons not to adopt the amendment when they turned down this offer. Due to the amendment of corporate law, the number of corporations adopting a committee system has increased. However, in this study, due to a lack of data regarding corporate governance, I do not consider the current

situation and the period I have considered is until 2014. Hence, I have not considered the situation in corporate governance since 2015.

Japanese board styles are classified into three models: the auditor model, committee model, and hybrid model between the market-oriented and insider-oriented models. I use a hybrid model for this study as a surrogate of the committee system. I also reflect on the factors that influence a corporation's board style, not only the ownership situation but also the employment system. These factors are related to each other and affect the corporate governance model. There is a coherent relationship among these factors. The conventional model among Japanese corporate boards is the auditor model,which is characterized by a long-term employment system and has features of the traditional style among Japanese corporate boards. This style of board is not affected by institutional investors, and corporate managers focus on the business inside the corporation. Without a robust outsider control system, thereis room for corporate managers to consume corporate assets for their own stake and build an empire to secure their position. In such a situation, corporate managers are assumed to take risk-averse behavior, be hesitant to invest in R&D investment, and prefer to invest in capital investment.

A corporation with the auditor system could be characterized by an insider-dominant board, relational finance, a long-term employment system, and tendencies to overinvest in capital investment for corporate growth and seek stability. On the other hand, corporations with a committee or officer system try to adopt more outsiders in the corporation and enhance the vigilance of the corporate board on the corporate manager. Therefore, the boards put pressure on the corporate manager to invest in R&D projects and be aware of stockholder value. Corporate managers are encouraged to take risk-taking behaviors and overinvest in R&D investment but underinvest in capital investment.

Hypothesis 2a: R&D investment is negatively associated with the auditor model and positively associated with the officer model.

Hypothesis 2b: Capital investment is positively associated with the auditor model and negatively associated with the officer model.

V. Data And Methodology

5-1.Methodology

Hypothesis 1 was tested using a panel analysis of data from a sample of Japanese electronics corporations for the five fiscal years from 2010 to 2014. Hypothesis 2 was tested using logit analysis and analyzes the relationship between corporate governance structure and financial and ownership factors. Therefore, the dependent variables are binominal dummy data, in that corporations adopting the auditor or officer systems would be categorized as "1".

I utilize a sample of Japanese corporations for the financial years from 2010 to 2014. The corporations chosen for data analysis are listed in the Tokyo Stock Exchange, and the sectors of the chosen corporations include the automobile, electronics, service, and apparel industries. I have not observed R&D spending by corporations that are assumed to spend on R&D, aside from only a few corporations. Large corporations were chosen because their management has more discretion in deciding whether to operate as a single or diversified business, compared with smaller corporations. A majority of the statistical data was collected from the "Yuka Shoken Houkokusho" (Report on Securities and Stocks in Tokyo Stock Exchange) and the Nikkei NEEDS Database.

5-2. Variables

a) Dependent Variables

As dependent variables, I take R&D intensity, R&D investment, and capital investment. R&D investment is defined by R&D expenditures per year. R&D intensity characterizes a corporation's R&D policy and is defined by the ratio of R&D expenditures to total sales. Capital investment characterizes a corporation's investment in physical assets and is defined by the ratio of Capital expenditures to total sales

Also, this study examines the factors that affect whether different board systems are adopted. In analyzing the relationships between board system and corporate governance variables, this study uses dummy variables to discern different board systems. The committee variable indicates the existence of committees as 1 if there are some Committees and 0 if there are no committees. The auditor and officer variable indicate the existence of an operating officer system, with 1 meaning there are some officers and 0 meaning there is no officer system.

b) Independent Variables

This study takes board composition, ownership, and financial performance as independent variables. As the board composition variables, I use the ratios of outside directors and inside directors. The ratio of outside directors is operationalized as the proportion of outside directors on the board, while the ratio of inside directors

is defined by the proportion of inside directors.

As the ownership variables, the ratio of institutional investors is the shareholding ratio held by institutional investors, including foreign investors (excluding foreign corporations), as well as the percentages of the shareholding held by the trust account and special account. The cross-shareholding ratio is defined as the percentage of cross-shareholding with other publicly held companies that are permitted to hold their shares. Board-officer duality is defined as the number of operating officers doubling as board members /number of board members.

The financial variable, Tobin's Q, is defined by (Fair Market Value + Total Liabilities) / Total Assets (including latent losses of subsidiaries and affiliates). ROA is operationalized as Ordinary Profit / Total Asset. Sales growth is defined by t-year sales/ (t − 1)-year sales. I considered the employment system as an independent variable to examine how it moderates the relationship between R&D and corporate governance. Long-term employment could be interpreted as a surrogate of human skill and mediate the relationship between R&D and corporate governance. Long-term employment is described by the percentage of full-time workers. Part-time employment is the percentage of part-time workers. I examine the linkages among ownership structure, employment system, and R&D expenditures.

VI. Modeling

My main specification is aimed at testing the effects of different factors regarding corporate governance. I focus on the following specification. Regarding the relationships among R&D investment, capital investment, board composition, ownership, and financial performance, I use the panel fixed effect model and Tobit model. At first, I analyzed the data with a fixed effect model.

$$\textit{R\&D investment (fixed effect model)} = \alpha + \beta_1(\textit{free cash flow}_{it}) + \beta_2(\textit{ROA}_{it}) + \beta_3(\textit{Tobin's Q}_{it}) + \beta_4(\textit{the ratio of institutional investors}_{it}) + \beta_5(\textit{cross-shareholding ratio}_{it}) + \beta_6(\textit{the ratio of outside directors}_{it}) + \beta_7(\textit{job tenure of employees}_{it}) + \beta_8(\textit{sales growth}_{it}) + \mu_t$$

$$\textit{Capital investment (fixed effect model)} = \alpha + \beta_1(\textit{free cash flow}_{it}) + \beta_2(\textit{ROA}_{it}) + \beta_3(\textit{Tobin's Q}_{it}) + \beta_4(\textit{the ratio of institutional investors}_{it}) + \beta_5(\textit{cross-shareholding ratio}_{it}) + \beta_6(\textit{the ratio of outside directors}_{it}) + \beta_7(\textit{job tenure of employees}_{it}) + \beta_8(\textit{sales growth}_{it}) + \mu_t$$

However, some corporations do not invest in R&D investment or capital investment, and the data include a 0 in R&D and capital investment. In such cases, the result would be influenced by data without any value. In order to strongly show the effects of board and ownership variables on R&D investment and capital investment, I need to censor the data of corporations without any R&D expenditures and capital investment, in order to avoid influencing the results. The Tobit model is appropriate in accounting for the non-normal distribution of a dependent variable for which the values are left censored at zero. Without censoring, the ordinary least square regression is inconsistent; therefore, a maximum likelihood estimation using the Tobit model results in a more consistent estimation (Land,1997; Marler& Faugère,2010).

$$\textit{R\&D intensity (Tobit model)} = \alpha + \beta_1(\textit{free cash flow}_{it}) + \beta_2(\textit{ROA}_{it}) + \beta_3(\textit{Tobin's Q}_{it}) + \beta_4(\textit{the ratio of institutional investors}_{it}) + \beta_5(\textit{cross-shareholding ratio}_{it}) + \beta_6(\textit{the ratio of outside directors}_{it}) + \beta_7(\textit{job tenure of employees}_{it}) + \beta_8(\textit{sales growth}_{it}) + \mu_t$$

$$\textit{Capital intensity (Tobit model)} = \alpha + \beta_1(\textit{free cash flow}_{it}) + \beta_2(\textit{ROA}_{it}) + \beta_3(\textit{Tobin's Q}_{it}) + \beta_4(\textit{the ratio of institutional investors}_{it}) + \beta_5(\textit{cross-shareholding ratio}_{it}) + \beta_6(\textit{the ratio of outside directors}_{it}) + \beta_7(\textit{job tenure of employees}_{it}) + \beta_8(\textit{sales growth}_{it}) + \mu_t$$

Also, this study examines the factors that affect the adoption of different board systems. In this study, the dependent variables are described as binominal variables. I categorize the corporations into two types: corporations adopting a specific board system are categorized as 1, and corporations without a specific system are described as 0. In order to regress data in which the dependent variable is binominal, it is appropriate to estimate the data with a logit model. Considering the effect of the year, I analyze the data from 2010–2014 with a logit fixed model.

Logit model of equation (auditor model) is:

$$Logit(p)=\alpha+\beta_1(free\ cash\ flow_{it})+\beta_2\ (ROA_{it})+\ \beta_3(Tobin's\ Q_{it})+\ \beta_4(the\ ratio\ of\ institutional\ investors_{it})+\beta_5(cross\text{-}shareholding\ ratio_{it})+\ \beta_6(the\ ratio\ of\ foreign\ directors_{it})\ +\beta_7(job\ tenure\ of\ employees_{it})\ +\beta_8(sales\ growth_{it})+\ \mu_t$$

Logit model of equation (officer model) is:

$$Logit(p)=\alpha+\beta_1(free\ cash\ flow_{it})+\beta_2\ (ROA_{it})+\ \beta_3(Tobin's\ Q_{it})+\ \beta_4(the\ ratio\ of\ institutional\ investors_{it})+\beta_5(cross\text{-}shareholding\ ratio_{it})+\ \beta_6(the\ ratio\ of\ foreign\ directors_{it})\ +\beta_7(job\ tenure\ of\ employees_{it})\ +\beta_8(sales\ growth_{it})+\ \mu_t$$

VII. Findings And Discussion

Regarding ownership structure, I explored the status quo of ownership and the effects of ownership on R&D investment and capital investment among corporations. According to the fixed effect model, both ownership by institutional investors and ownership by foreign investors are positively associated with capital intensity. Even though the relationship between ownership by foreign investors or by investor and R&D intensity are positively associated ($p>0.1$),this result is not eligible and valid due to that R2 value is too low. The Tobit model, both capital intensity and R&D intensity are associated with ownership by institutional investors and capital investment. The reason to enhance the significance is that I censored the data in the Tobit analysis without R&D investment and capital investment. Censoring data could elucidate the effects of corporate governance on R&D and capital investment. In other words, ownership by institutional and foreign investors would not only promote R&D investment, which is risky, but also capital investment, which is assumed to be not risky. Hypothesis 1a is partially supported, in that institutional ownership is positively associated with R&D investment; however, institutional ownership has a positive association with capital investment, which is opposite to the assumption of the hypothesis.

In the relationships among R&D, capital intensity, and board composition, the ratio of outside directors is negatively associated with R&D investment and the association between the ratio of outside directors and capital intensity is not significant. The relationship between R&D investment and the ratio of outsider directors is negative. In Japan, insider directors dominate the composition of Japanese corporate boards, which affected the results. Even though Japanese corporate boards are not composed predominately of outsiders, institutional investors affect corporations to promote R&D investment. Their influence on R&D does not occur through outside directors. Hypothesis 1b is not supported, as there is a positive association between high ratios of outsiders on the corporate board and R&D investment and a negative association between the ratio of outsiders and capital investment.

Regarding the financial variables, free cash flow is negatively associated with R&D and capital intensity. Free cash flow is the cash that corporations are able to generate after spending the necessary funds for the corporation's business and the cash that a corporation can consume at its discretion for investment. According to agency theory, retaining free cash flow in a corporation leads corporate managers or CEOs to gain more power and discretion, and invites inefficiently distributions of assets within a corporation. In the association between free cash flow and R&D, capital intensity is negative, means that R&D and capital investment promote efficient cash distribution and could solve the agency problem regarding free cash flow. In Tobit analysis, Tobin's Q is positively associated with R&D intensity and is not significantly associated with capital intensity. In the Tobit analysis, data without any R&D investment were omitted and data censoring was used. I assumed that the effect of R&D on Tobin's Q observed in the Tobit model was more elucidated than that observed in the fixed effect model. Therefore, I adopted the results of the Tobit model in this study.

Tobin's Q is the market value divided by the replacement value of corporate assets and is appropriate for measuring the evaluation or value of a corporation The positive relationship between both of them reveals that R&D, capital investment contribute to enhancing the market value of corporations among stockholders and leads the corporation to be well evaluated in the market.

This study also reveals that ROA is negatively associated with R&D and capital investment, and the association between sales growth and R&A intensity is negative. Although R&D investment is positively valued in the market, it is neither efficient nor effective in generating substantial profit for the corporation. Corporations fail to invest effectively in R&D, which is not linked to creating profit.

Regarding corporate board style, both the auditor model and officer model are characterized by corporate governance factors, in accordance with my assumption that the auditor model is negatively associated with ownership by foreign investors and the ratio of outside directors, while the officer model is positively

associated with each. R&D intensity has a positive association with the auditor model, while capital investment has a negative association with the officer model. These results fit hypotheses 2a and 2b. Hypothesis 2a, in which R&D investment is negatively associated with the auditor model and positively associated with the officer model, is supported, and Hypothesis 2b, in which capital investment is positively associated with the auditor model and negatively associated with the officer model, is also supported.

VIII. Conclusion

This study assumed that R&D investment is a risky project while capital investment is not risky, in accordance with the proposition of agency theory. However, the corporate governance variables have the same ways effects on both R&D and capital investment. There are no opposite flows of results between R&D and capital investment. Institutional ownership has an effect on R&D and capital investment, meaning that institutional ownership puts pressure on corporate officers to allocate rents to R&D expenditures and capital investments. Meanwhile, R&D intensity is negatively associated with the ratio of outside directors. Even though no significant relationship between the ratio of outsiders on corporate boards and capital intensity was observed, this study reveals that while institutional investors affect corporations by promoting R&D investment, their influence on R&D is not addressed through outside directors dispatched by institutional investors.

According to the results of the logit analysis regarding the auditor model and officer model, the auditor model is negatively associated with R&D and capital intensity and positively associated with the intensity of both. The analysis reveals that high ratios of institutional investor ownership and the adoption of outsiders in corporate boards promote R&D and capital investment. R&D does not guarantee cash returns in the future and is risky, as I mentioned. Outsider pressure drives corporate managers to tackle R&D and expand their business, but the return from such investments is not certain. Such behaviors among managers would be highly valued in corporations; however, the relationship between such projects and profit cannot be confirmed in this study.

In Japan, corporate law was amended this year, leading to companies with audit and supervisory committees being introduced, aimed at enhancing the monitoring ability of boards. The amended corporate law obliges corporations to have over two outsiders. Such reforms are expected to push corporations to embark on new ventures by being exposed to pressure from outsiders or the market. Also, corporate boards should be required to monitor the process of such ventures. This study could not describe the associations between human resources and corporate governance and R&D or capital investment, even though these were some of the main issues that the study would have made clear. Future research will be conducted on how employment systems mediate the relationship between R&D and capital investment and corporate governance.

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Table1: Descriptive Statistics

	mean	sd	min	max
Auditor model	0.44	0.5	0	1
Officer model	0.54	0.5	0	1
R&D Intensity	2.58	12.87	0	970
Capital Intensity	4.75	17.28	0	1469
ROA	-1.33	8.22	-150.5	249
TOBIN's Q	-0.04	0.34	-1.3	4
Free Cash Flow	-2.32	145.92	-14594.5	215
Ownership of Institutional investor	13.83	15.44	0	75
Ownership of Foreing Investor	8.64	11.19	0	83
CROSS Shareholding ratio	6.43	8	0	58
The ratio of Outside director	11.15	14.36	0	89
Job tenure of employee	12.3	6.03	0	32
Sales Growth	1.24	24.41	-100	1048
N	10057			

Table2: "Fixed Effect Model of R&D Intensity and Capital Intensity"

independent variable	R&D intensity		Capital Intensity	
model	model1	model2	model3	model4
	b/t	b/t	b/t	b/t
ROA	-0.0493**	-0.0474**	0.0003	0.005
	[-2.39]	[-2.30]	[0.01]	[0.28]
TOBIN Q	-5.3386***	-5.2896***	0.1807	0.5406
	[-8.10]	[-8.11]	[0.31]	[0.95]
Free Cash Flow	0.001	0.0011	-0.0965***	-0.0965***
	[1.25]	[1.31]	[-135.69]	[-135.37]
Ownership of Institutional Investor	0.0462		0.1123***	
	[1.62]		[4.51]	
Ownership of Foreign Investor		0.0619		0.0572*
		[1.84]*		[1.94]
CROSS Shareholding ratio	0.004	0.0044	0.0012	-0.0028
	[0.17]	[0.18]	[0.06]	[-0.13]
Ratio of Outside director	-0.0349**	-0.0359**	-0.0056	-0.0053
	[-2.02]	[-2.08]	[-0.37]	[-0.35]

Job tenure of Employee	0.0105	0.0125	-0.0402*	-0.0459**
	[0.44]	[0.52]	[-1.92]	[-2.18]
Sales Growth	-0.032***	-0.0321***	-0.0006	-0.0004
	[-7.70]	[-7.72]	[-0.17]	[-0.11]
Constant	1.9515***	2.0435***	3.5281***	4.7008***
	[3.34]	[4.00]	[6.91]	[10.52]
Fixed Effect	Yes	Yes	Yes	Yes
R-squared				
within	0.0191	0.0192	0.7684	0.7679
between	0.0115	0.0118	0.6254	0.6378
overall	0.0028	0.0028	0.7214	0.7237
Nobs	10046	10046	10046	10046
* p<0.1, ** p<0.05, *** p<0.01				

Table3:"Tobit Estimation of R&D Intensity and Capital Intensity"

independent variable	R&D intensity		Capital Intensity	
model	model1	model2	model3	model4
	b/t	b/t	b/t	b/t
ROA	-0.3101***	-0.2978***	-0.0259**	-0.0172
	[-15.08]	[-14.57]	[-2.07]	[-1.38]
TOBIN Q	3.1462***	3.2465***	0.8871***	0.9754***
	[6.71]	[6.93]	[3.13]	[3.43]
Free Cash Flow	-0.0045***	-0.0043***	-0.1009***	-0.1008***
	[-2.80]	[-2.67]	[-153.37]	[-152.99]
Ownership of Institutional Investor	0.1185***		0.0607***	
	[11.36]		[9.53]	
Ownership of Foreign Investor		0.1449***		0.0653***
		[10.08]		[7.44]
CROSS Shareholding ratio	-0.0321	-0.0246	0.0073	0.0106
	[-1.57]	[-1.20]	[0.59]	[0.85]
Ratio of Outside director	0.0126	0.0113	-0.0083	-0.0077
	[1.14]	[1.01]	[-1.24]	[-1.14]
Job tenure of Employee	0.2172***	0.2346***	-0.0312*	-0.0207
	[7.79]	[8.44]	[-1.87]	[-1.24]
Sales Growth	0.0027	0.0024	-0.0053	-0.0055
	[0.42]	[0.37]	[-1.33]	[-1.38]
Constant	14.6012***	14.6109***	9.2081***	9.2235***
	[123.56]	[123.55]	[139.71]	[139.70]
LR chi-square	422.46	394.74	12580.15	12544.85
Pseudo R2	0.0063	0.0058	0.1491	0.1486
Log likelihood	-33540.354	-33554.21	-35910.175	-35927.825
Nobs	10046	10046	10046	10046

* p<0.1, ** p<0.05, *** p<0.01

Table 4: Logit Model Estimation of Auditor Model and Officer Board Model

independent variable	auditor model		officer model	
model	model1	model2	model3	model4
	b/t	b/t	b/t	b/t
R&D Intensity	-0.1096*		0.103*	
	[-1.88]		[1.77]	
Capital Intensity		-0.0459**		0.0504**
		[-2.27]		[2.51]
ROA	-0.0212	-0.0128	0.0188	0.0108
	[-1.55]	[-0.96]	[1.43]	[0.83]
TOBIN'S Q	0.1367	0.0761	0.0496	0.1118
	[0.31]	[0.17]	[0.12]	[0.27]
FREE CASH FLOW	0.0023	-0.0008	-0.003	0.0004
	[0.39]	[-0.13]	[-0.53]	[0.06]
Ownership of Foreign Investor	-0.0495**	-0.0493**	0.0423**	0.0426**
	[-2.39]	[-2.39]	[2.09]	[2.10]
Cross Shareholding Ratio	0.0489***	0.0474**	-0.0486***	-0.0472**
	[2.61]	[2.53]	[-2.64]	[-2.56]
Ratio of Outside director	-0.0671***	-0.0658***	0.0534***	0.0521***
	[-6.24]	[-6.14]	[5.41]	[5.28]
Job tenure of Employee	0.0656***	0.0634***	-0.0632***	-0.0611***
	[4.05]	[3.93]	[-4.02]	[-3.90]
Sales Growth	-0.0061*	-0.0054*	0.0063*	0.0054*
	[-1.84]	[-1.66]	[1.89]	[1.69]
Fixed Effect	Yes	Yes	Yes	Yes
Log likelihood	-498.822	-497.956	-514.853	-513.166
LR chi-square	118.79	120.52	100.54	103.91
Nobs	1429	1429	1444	1444
* p<0.1, ** p<0.05, *** p<0.01				