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CORPORATE GOVERNANCE AND TOP EXECUTIVE COMPENSATION:

EVIDENCE FROM JAPANESE FIRMS

by

TOSHIAKI MITSUDOME

A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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Sept 11/2000
Date

Joseph Weintrop
Chair of Examining Committee

September 15, 2000
Date

Gloria Thomas
Executive Officer

Sudipta Basu

Masako Darrough

Lee-Seok Hwang

Charles Tang
Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

CORPORATE GOVERNANCE AND TOP EXECUTIVE COMPENSATION : EVIDENCE FROM JAPANESE FIRMS

by

Toshiaki Mitsudome

Advisor: Joseph Weintrop

This dissertation investigates the association between top executive compensation and the corporate governance mechanisms for large Japanese firms. Specifically, I examine whether *the level* of top executive compensation decreases, as the firm's governance mechanism becomes stronger. I also examine the association between *the sensitivity of executive pay to firm performance* and various governance structures to test whether incentive contracts are used as a complement or substitute for institutional monitoring.

I impute total amounts of earned compensation from the amounts of income tax paid by individual executives for the period from 1992 to 1996. Using 981 firm-year observations, I find that the level of top executive compensation is negatively associated with *keiretsu* affiliation, leverage and the percentage of outside directors on the boards. This suggests that as the firm's corporate governance mechanism becomes stronger, the scope for managerial opportunism

becomes smaller.

I also find that the sensitivity of top executive compensation to firm performance, as measured by ROA, increases for *keiretsu* firms and as the percentage of outside directors increases. This result is consistent with the "incentive-complement" hypothesis, which predicts that firms with stronger governance mechanisms can force riskier compensation on their managers. On the other hand, I find that the sensitivity of executive pay to firm performance decreases as leverage increases. This finding is consistent with the "incentive-substitute" hypothesis. Under this hypothesis, firms with stronger governance mechanisms are already monitoring their managers, and, therefore, they rely less on executive incentive contracts to motivate and discipline their managers.

Finally, I find that the level of compensation increases as the level of managerial ownership increases, suggesting that firms with a higher level of managerial ownership experience greater agency problems. I also find that the sensitivity of pay to performance *increases* as the level of managerial ownership increases for *keiretsu* firms, but it *decreases* for non-*keiretsu* firms. This suggests that top executives of non-*keiretsu* firms are more likely to entrench themselves as their ownership increases.

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Chapter 1: Introduction

In this dissertation, I investigate the association between top executive compensation and the corporate governance structures of 200 large Japanese firms. I test several hypotheses about the effectiveness of various governance mechanisms in Japan in reducing the agency problems between owners and their managers. I first examine whether the *level* of top executive compensation is *lower* for firms with "stronger" governance mechanisms, controlling for the standard determinants of executive pay. I define that a firm has a "strong" governance mechanism when it has strong ties to a main bank, a high level of ownership by blockholders, an affiliation to an industrial group and/or outside directors on the board (Aoki [1994], Sheard [1994a&b] and Berglof and Perotti [1994]). I hypothesize that firms with these stronger governance mechanisms can monitor the management more effectively and, as a result, can reduce managerial opportunism, which manifests itself when top executives pay themselves higher levels of compensation than an equilibrium level (Core et al. [1999]).

Second, I examine the association between *the sensitivity of top executive compensation to firm performance* and their governance structures. Here, I test

two competing hypotheses concerning the complementary (or substitutive) nature of top executive incentive contracts and other institutional forms of corporate governance. The "incentive-complement hypothesis" predicts that the sensitivity of top executive pay to firm performance is *higher* for firms with *stronger* governance mechanisms in place. This is predicted because firms with stronger governance mechanisms have the power to impose riskier compensation designs on the managers to motivate and discipline them. Under this hypothesis, executive incentive contracts are used as a complement to other institutional forms of corporate governance, such as the monitoring by the main bank and outside directors.

In contrast to the incentive-complement hypothesis, the "incentive-substitute hypothesis" predicts that the sensitivity of executive pay to firm performance *decreases* for firms with *stronger* governance mechanisms. The argument here is that firms with stronger governance mechanisms are already effectively monitoring their managers and, therefore, they need to rely less on incentive contracts to motivate and discipline the managers (see Kang and Shivdasani [1999]).[1] In this sense, executive incentive contracts and institutional monitoring are substitutes. This hypothesis is also consistent with the argument that for strongly monitored firms, there is a greater flow of information on managerial performance, which includes such factors as the level of efforts. As a

[1] Kang and Shivdasani (1999) examine the associations between managerial incentives in the form of equity shareholding by insiders and other governance structures, such as board size and fraction of outside directors on the board. Therefore, they do not specifically address the substitutive (complementary) nature of top executive compensation in relation to other forms of corporate governance.

result, top executive compensation will be based more on input-based performance measures. Assuming that output-based performance measures are less than perfectly correlated with managerial input, the sensitivity of executive pay to firm performance decreases, as the governance structure becomes stronger.

Finally, I investigate the association between top executive compensation and the level of managerial ownership. I hypothesize that as the managerial ownership increases, the top executive's power increases and as a result, he is more likely to engage in opportunistic behavior. Once again, one manifestation of managerial opportunism is top executives' paying themselves higher levels of compensation. At the same time, more powerful top executives can design their compensation to be less risky, i.e., less sensitive to firm performance.

Admittedly, this prediction appears inconsistent with what is posited by the agency theory, which predicts that as the managerial ownership increases the likelihood of managerial opportunism *decreases* due to the convergence of interests between managers and shareholders (Jensen and Meckling [1976]). However, I argue that for Japanese firms, the convergence of interests is less likely since the level of managerial ownership is generally quite low.[2] At these levels of managerial ownership, top executives can, I argue, engage in opportunistic behaviors without incurring a large cost of doing so. In addition, higher level of managerial ownership also captures the effect of greater power exercised by top executives of family-owned firms or top executives who are also

the founders. Anecdotal evidence suggests that for family-owned firms or firms whose top executives are also the founders, top executives have greater power over firm's decisions. To the extent that these firms are characterized by high managerial ownership, I expect a positive (negative) association between the level of (the sensitivity thereof to firm performance) compensation and the level of managerial ownership, due to managerial entrenchment.

[2] Kaplan (1994) finds top executives of Japanese firms on average own 0.24 percent (median=0.02 percent) in 1984, while U.S. CEOs on average own 0.68 percent (median=0.05 percent), excluding stock options, in 1987.

1.1. Corporate governance of Japanese firms

I observe many firms in Japan relying on a governance mechanism that is "relationship-oriented." Under this relationship-based governance mechanism, managers are supposedly monitored by a combination of banks, large corporate shareholders and other firms belonging to a corporate group (e.g., Aoki [1990] and Kaplan [1999]). The lead monitoring role is customarily designated to one bank, called "the main bank", which is usually the top lender to and often one of the largest shareholders of the firm (Aoki [1994a&b] and Sheard [1994a&b]). Aoki et al. (1994) and Sheard (1994a) argue that, although the main bank passively monitors management during a "normal" time, it takes a more active role and often intervenes with the management when the firm faces financial difficulty. This is how the main bank system can substitute for an external, market-based control mechanism (e.g., Aoki et al. [1994]).

The main bank often ties in to a corporate group, commonly known as a "*keiretsu*". A *keiretsu* is an industrial group, in which its member firms, bound together by stable cross-shareholdings, maintain long-term business and financial ties with one another. According to Dodwell Marketing Consultants (1990), there are seventeen major *keiretsu* in Japan, of which eight are organized around a major commercial (main) bank. The eight are Mitsubishi, Mitsui, Sumitomo, Fuyo, Daiichi Kangyo Bank (DKB), Sanwa, Tokai and Industrial Bank

of Japan (IBJ). These eight are commonly referred to as the "financial" *keiretsu*.[3] For the financial *keiretsu*, the main bank serves as "the central organ in the group and plays the leading role in the financial activities in the group" (Kang and Shivdasani [1995]). Also, financial *keiretsu* firms are generally more highly leveraged (Nakatani [1984]), and they borrow more heavily from financial institutions within the group, particularly the main bank (Berglof and Perotti [1994]). Taken together, I argue that the main bank relation is stronger for the financial *keiretsu* firms than for vertical *keiretsu* firms and non-*keiretsu* firms.[4]

In addition to the main bank monitoring, a mechanism of mutual monitoring appears to exist among non-financial members of a *keiretsu*. Berglof and Perotti (1994) argue that the *keiretsu* system encourages cooperation and mutual monitoring among managers of its member firms through a coalition-enforced threat of dismissal. By pooling voting rights, the authors argue, the *keiretsu* coalition can exercise control over management of any member firm to ensure that no manager is engaged in opportunistic behaviors. Collusion among managers is discouraged because poor profitability results in financial distress, which would eventually lead to intervention by the largest lender, often the main bank. Berglof and Perotti (1994) term this *keiretsu* style of corporate governance

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[3] As opposed to the "financial" (horizontal) *keiretsu*, which is a group of large firms in diversified industries with a main bank at its core, the "vertical" *keiretsu* is one in which a group of subcontractors is organized under one large manufacturing firm (Hoshi [1994]). Many previous studies focus on the characteristics of financial *keiretsu* and distinguish them from other *keiretsu* firms and independent firms (Berglof and Perotti [1994] and Nakatani [1984]). Hereafter, *keiretsu* refers to a financial *keiretsu* unless otherwise noted.

[4] Although virtually every firm in Japan has one bank serving the role of the main bank, the strength of the relationship between a firm and its main bank depends upon several factors, such as the degree of the firm's reliance on bank loans and the financial health of the firm.

as a "state contingent" mechanism, in which the source of control shifts from an implicit threat of coalition power to a more explicit intervention by the main bank at a time of financial difficulty. Furthermore, many firms in Japan have board of directors whose previous employers are banks and other *keiretsu* member firms, termed "outside directors" (Kaplan and Minton [1994]). Some argue that one of the functions of these outside directors is to strengthen the monitoring of the host firm's management. (Aoki et al. [1994], Kaplan and Minton [1994] and Sheard [1994a]).

A number of empirical studies shows that this main bank and/or *keiretsu*-based governance mechanism is effective in monitoring and disciplining management. For example, Kaplan and Minton (1994) show that the likelihood of appointments of outside directors increases with poor performance. They also show that the likelihood of "bank directors" appointments increases as firms' borrowings increase, while that of "corporate directors" appointments increases as firms' shareholding concentrations increase. [5] In addition, Kaplan and Minton (1994) find that the likelihood of corporate directors is higher for *keiretsu* firms. Examining the non-routine turnover of top executives, Kang and Shivdasani (1995) show that the likelihood of turnover is significantly related to firm performance, as measured by industry-adjusted return on assets, excess stock return and negative operating income. They also find that the sensitivity of turnover to performance is higher for firms with main bank ties, and that outside

[5] Kaplan and Minton (1994) define "bank directors" as board of directors previously employed by banks, and "corporate directors" as those previously employed by non-financial institutions.

succession is more likely for firms with large shareholders and with main bank ties.

1.2. Executive compensation for Japanese firms

In Japan, top executive compensation typically consists of cash salary and cash bonus. Stock-based compensation, such as stock options and stock grants, was not available until recently due to the legal restriction on share buyback and unfavorable tax treatments for recipients (Yasui [1999]).[6]

The Commercial Law requires that the amounts of executive salary be either clearly stated in the Articles of Corporation and/or approved at the general shareholders' meeting (Kobayashi [1997]). In reality, however, most firms choose to set the maximum amounts of *total* annual salary that they pay to *all* directors and have them approved by the general shareholders' meeting (The Dai-ichi Mutual Life Insurance Company [1999]).[7] Firms usually revise the maximum salary amounts every four to five years to adjust for such factors as inflation, macro-economic conditions, the change in the number of board members, among others (The Dai-ichi Mutual Life Insurance Company [1999]). Once the maximum amount is approved, the board of directors is legally responsible for deciding the

[6] Until the Commercial Law was revised in 1997, firms were not allowed to buy back their own shares, and, as a result, it was difficult to grant stock options. Since the revision, which has allowed firms to buy back up ten percent of their own shares, 96 listed firms have adopted stock option programs (Yasui [1999]). Also, an unfavorable tax treatment of stock options, which is currently under review, has been an impediment for stock options (OECD [1996]).

individual amount paid to each director. However, for many firms the boards of directors entrust the right to their top executive (Dai-ichi Mutual Life Insurance Company [1999] and Kobayashi [1997]).

In contrast to executive salary, executive bonus is paid as an appropriation of the firm's retained earnings and, therefore, the total amount of bonus must be approved at the annual general shareholders' meeting. As in the case of executive salary, the boards of directors of many firms generally assign their top executives the right to determine individual amounts, (Kobayashi [1997]).

Despite the veto power given to the shareholders through the general shareholders' meetings, they can hardly use it in reality (Okushima [1996]). This is because it is extremely difficult for individual shareholders to obtain a majority vote since the majority of the shares are held by corporations and financial institutions affiliated with the firm. These large shareholders are generally sympathetic to the incumbent management, and do not intervene unless the firm suffers financial distress (e.g., Sheard [1994]).

In short, it can be said that for most firms top executives can exercise significant influence over compensation-related decisions, absent strong governance mechanisms.

1.3. The empirical model used to test the hypotheses

[7] Revising the Articles of Corporation requires approval by two-third of all the attendees of the general shareholders meetings, while simply revising the total amount of executive salary only requires a majority. The Commercial Law requires that the general shareholders' meeting only approve the total, not individual, amount of executive salaries (Kobayashi [1997]).

In order to test the hypotheses regarding the effectiveness of the Japanese governance mechanisms in reducing the managerial opportunism regarding compensation, I examine the association between the *level* of top executive compensation and a number of variables proxying for the strength of the governance mechanisms. I use *keiretsu* affiliation as a proxy for *keiretsu* monitoring, and leverage, as measured by the ratio of total liability to total assets, as a proxy for the strength of main bank monitoring. I also use the percentage of outside directors on the board as a proxy for the strength of monitoring by large shareholders and debtholders. I also examine the effect of the percentage of managerial ownership as a proxy for the top executive power. Consistent with Core et al. (1999), I control for firm size, firm performance, investment opportunity and risk.

In addition to the firm characteristics above, I also include in the regression variables proxying for human capital, such as age, tenure as top executive and education. Core et al. (1999) argue that if any of the governance variables turns out to be significant with an expected sign, then we may infer that the governance mechanisms affect the level of top executive compensation.

In order to examine whether incentive contracts are used as a complement or substitute for other institutional forms of monitoring, I examine the interactions between the firm performance variables and the governance variables in a compensation regression. The interaction terms reflect the effects of various governance mechanisms on the sensitivity of top executive compensation to firm performance measures. If incentive contacts and other institutional monitoring

are complementary, then I expect the sensitivity of pay to performance *increases* as the governance structures become stronger, as would be indicated by a *positive* coefficient on the interaction terms. On the other hand, if incentive contracts are used as a substitute for institutional monitoring, then the sensitivity of pay to performance is expected to *decrease* as the governance structures become stronger, as would be indicated by a *negative* coefficient on the interaction terms.

Ideally, I would like to have the exact amount of top executive compensation. However, there is no data publicly available on compensation amounts paid to *individual* top executives or details of the compensation contracts for Japanese firms. Therefore, I impute individual amounts of compensation from the amounts of income tax paid by top executives as a proxy for compensation.

1.4. Summary of the results

Using 981 executive-year observations for 200 of the largest firms in Japan for the 1992-1996 period, I find that the level of top executive compensation is, on average, lower for *keiretsu* firms than for non-*keiretsu* firms. I also find that the level of top executive compensation decreases as leverage increases, and as the percentage of outside directors on the board increases. These results are consistent with the arguments that *keiretsu* firms are more strongly monitored by their main banks and other member firms than are non-*keiretsu* firms. They also suggest that the monitoring by the main banks is stronger as firms borrow more,

and that the monitoring by the major shareholders and/or debtholders increases as the proportion of outside directors increases.

I also find that the sensitivity of top executive compensation to firm performance, measured by return-on-assets, is substantially higher for *keiretsu* firms than for non-*keiretsu* firms, and as the percentage of outside directors increases. This is consistent with the incentive-complement hypothesis, which predicts that firms with stronger governance use executive incentive contracts tied *more strongly* to firm performance in order to motivate and discipline their managers. I conjecture that *keiretsu* firms have greater incentives to ensure that none of the member firms behaves opportunistically (Berglof and Perotti [1994]), and that the coalition of member firms has the power to hold the managers accountable for firm performance.

In contrast, I find that the sensitivity of top executive compensation to firm performance decreases as leverage increases, suggesting that more highly leveraged firms are already effectively monitored and, as a result, they need to rely less on incentive contracts for the top executives (incentive-substitute hypothesis).

As for managerial ownership, I find that the level of top executive compensation *increases*, and the sensitivity of compensation to firm performance *decreases*, as the level of managerial ownership increases. This result is consistent with the argument that as managerial ownership increases, the top executive's power increases and, as a result, he is likely to entrench himself. One consequence of the managerial entrenchment is the top executives' paying

themselves higher levels of compensation. Also, more powerful top executives can design their compensation to be less risky, i.e., less sensitive to firm performance.

1.5. Literature review and contributions of this dissertation

This dissertation contributes to the understanding of the effectiveness of the Japanese style of corporate governance. Kaplan (1994) examines the association between firm performance and top management turnover for 119 Japanese firms during the 1980-1988 period and finds that the likelihood of turnover is negatively related to stock returns and earnings, controlling for managers' age and tenure. Kaplan and Minton (1994) study the association between firm performance and appointments of outside directors and find that the likelihood of appointment of an outside director increases with poor stock performance, and that of a bank director increases with reported accounting losses. They also show that the likelihood of incumbent top executive turnover substantially increases in the year of an outside director appointment.[8] They also report some improvement in the performance of the Japanese firms after outsiders were appointed to the boards. Based upon these results, the authors argue that appointments of outsider directors are generally considered "an indication that the main bank or outside corporation is paying particular attention to the governance of the appointing firm". Although they did not directly address

[8] The authors find somewhat weaker results for U.S. firms.

the effect of alternative governance mechanisms on management turnover and outside appointment, Kaplan (1994) and Kaplan and Minton (1994) show that there exists an alternative governance mechanism which disciplines poorly performing management.

Kang and Shivdasani (1995) investigate the role of alternative governance mechanisms during top executive turnovers. Using data on 270 Japanese firms for the 1985-1990 period, they show that the sensitivity of non-routine turnover to earnings performance measures is significantly higher for firms with main bank ties than for firms without such ties. The authors attribute this result to the main banks playing an important governance function. They also show that the likelihood of outsider succession is higher for firms with large block shareholders and main bank ties, suggesting that these governance mechanisms, especially that provided by large block holders, are effective in replacing top executives with outsiders.

In this dissertation, I extend this line of research by investigating the association between alternative governance mechanisms and top executive compensation for Japanese firms. The study of executive compensation is important because executive compensation itself is considered an alternative mechanism of corporate governance in a sense that it is used to motivate managers to act in the interests of shareholders and other stakeholders (e.g., Maher and Anderson [1999]). Provided that firms use top executive compensation to motivate and discipline managers, it is not clear whether they use it as a substitute or complement for other institutional monitoring. Therefore,

I believe it important to investigate the inter-relationships between the alternative governance mechanisms and executive compensation designs.

Empirical research investigating top executive compensation for Japanese firms is limited. This is mostly due to the fact that there is no publicly available data on the details of compensation. Firms are only required to report aggregate amounts of executive compensation paid to all directors (Kaplan [1994] and Kato and Rockel [1992]). For this reason, the previous papers had to rely on either the aggregate amounts of executive compensation for *all* directors (Kaplan [1994] and Ang and Constand [1997]) or individual amounts of compensation imputed from income tax paid in 1985, which were compiled by Toyo Keizai Inc. (Kato and Rockel [1992]). Using individual amounts imputed from income tax paid for the five-year period from 1992-1996, I am able to study the association between alternative governance mechanisms and *individual* compensation designs.

1.6. Organization of the dissertation

The remainder of this dissertation is organized as follows. Section 2 discusses the characteristics of the ownership and board structures, existing governance mechanisms, and executive compensation for Japanese top executives. In Section 3, I review the literature that provides recent evidence on the corporate governance and top executive compensation of Japanese firms. Section 4 develops hypotheses for this dissertation and Section 5 discusses the data used for this study. Section 6 provides empirical models to test the

hypotheses and also discusses the results of the descriptive statistics and empirical tests. In Section 7, I present a summary and conclusions as well as a discussion of the limitations of this study and make suggestions for future extensions.

Chapter 2: Characteristics of Japanese Corporate Governance

In this section, I first discuss characteristics of the corporate governance structures, such as the board and ownership structures, of large Japanese public corporations. Subsequently, I discuss the alternative governance mechanisms, such as the main bank system and *keiretsu*. I then discuss features of executive compensation in Japanese firms.

2.1. Governance structures of Japanese firms

The key characteristics of corporate governance structures for Japanese firms are summarized as follows: 1) the boards of directors are dominated by insiders who have been promoted from the ranks of middle managers; 2) the majority of shares is owned by other firms and financial institutions with business ties to the firm; and 3) the share ownership of top executives is modest in part due to lack of stock options.

The boards of directors in Japan (called "*torishimari-yaku*" or "*yakuin*") are legally appointed by shareholders to make strategic decisions and "supervise affairs of directors" on behalf of the shareholders (Yasui [1999]). Although a typical Japanese firm has 20 members on the board, it is common for a large firm to have more than 40 directors, e.g., Toyota Motors has 61 directors as of 1998.[9] The board of directors of a Japanese firm is often dominated by insiders, who are promoted from the ranks of middle managers within the firm.[10] The president ("*shacho*") usually is the most powerful member of the board, except in rare cases the chairman ("*kaicho*"), who often is a former president, has higher authority than the president (Kaplan [1994]).

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[9] As of July 1997, 49 publicly traded firms have over 40 directors (*The Weekly Toyo Keizai*, 9/20/1997).

[10] According to *Kigyo Keiretsu Soran*, published annually by Toyo Keizai Inc., for all the listed firms in Japan, 75 percent of the board members are internally promoted, while the remaining 25 percent are outsiders, who came from banks, other corporations, and government agencies.

The practice of promoting insiders creates a hierarchical structure on the board, in which each director's promotion, as well as job security, depends, to a large extent, on his relation with the top executive (Yasui [1999]). Therefore, despite the legal rights of each director, Yasui (1999) suggests that it is difficult for board of directors to effectively monitor and control the affairs of the entire board, especially as they relate to the top executive.

Financial institutions and other corporations collectively own about 70 percent of a typical firm's shares, although each entity owns a small percentage of the shares (Organization for Economic Cooperation and Development [1996] and Sheard [1994]). Corporate shareholdings are typically reciprocal, i.e., firms own one another's shares (commonly referred to as "cross-shareholding"). Firms also implicitly agree not to sell one another's shares without consulting with the incumbent management, an arrangement called "stable shareholding" (or "*antei-kabunushi*"). The level of cross-shareholding tends to be higher for *keiretsu* member firms, ranging from 9.4 to a high of 38.2 percent for Mitsubishi and Sumitomo groups (Fair Trade Commission [1994]). The objectives of the cross-shareholding and stable shareholding arrangement are to support cooperative behavior among firms (Berglof and Perotti [1994]) and to insulate themselves against potential hostile takeovers (Sheard [1994]). The number of mergers and acquisitions in Japan is low, compared to that in the U.S. According to surveys by Yamaichi Securities and Nomura Research Institutes (as reported in OECD [1996]), there were 431 cases reported in Japan while as many as 3,930 cases

are reported in the U.S. in 1993. Therefore, external control provided by takeovers and proxy fights appears to be exercised less frequently in Japan.

Compared to U.S. firms, ownership by top executives is low in Japanese firms. From a sample of 119 large Japanese firms for 1980-1988, Kaplan (1994) shows that top executives of Japanese firms own on average 0.24 percent of their firms' shares (the median is 0.02 percent). Along with the fact that stock-based compensation, such as stock options, has rarely been used in Japan until recently, this low level of ownership by Japanese top executives might not provide enough incentive to increase shareholder values (Kaplan [1994]).

Given the characteristics discussed above, it is an empirical question whether such a system is effective in monitoring managers.

2.2. Alternative governance mechanisms

Some argue that a firm's long-term relationships with banks and large corporate shareholders function as alternative governance mechanisms for Japanese firms. For example, Aoki et al. (1994) and Sheard (1994) among others argue that the main bank system substitutes for internal and external (market-based) control mechanisms. The main bank system is a long-term arrangement between a firm and its bank, in which the bank provides loans, services related to issuing bonds, and managerial know-how and resources. Normally, the main bank is the top lender to and one of the largest shareholders of the firm.[11]

[11] Under the Anti-Monopoly Law, a bank in Japan is allowed to own up to five percent of a firm's stock.

According to Aoki et al. (1994), the main bank performs three types of monitoring: *ex ante* – via screening of loan applications; *interim* – via arms'-length monitoring and/or placing a director on the board; and *ex post* – intervening in and possibly removing the incumbent management. In this sense, the *interim* monitoring functions as internal control and the *ex post* monitoring substitutes for takeovers and/or proxy fights. As long as the threat of the main bank intervention is real, this system can provide *ex ante* deterrence to opportunistic behaviors, just as do market control mechanisms.

In addition, Berglof and Perotti (1994) argue that the *keiretsu* system provides "a contingent governance mechanism", in which discipline and monitoring among member firms are encouraged and sustained over time. They analytically show that the *keiretsu* system encourages cooperation and mutual monitoring among managers of the member firms through a coalition-enforced threat of dismissal. When a firm suffers financial trouble, however, this threat becomes less effective, and the governance mechanism shifts to main bank intervention. Berglof and Perotti (1994) argue that *keiretsu* firms have a "comparative information advantage" over non-*keiretsu* firms because *keiretsu* firms can observe one another's performance better through "a combination of financial and product information obtained in constant interactions" among themselves.

2.3. Executive Compensation for Japanese Firms

According to the Commercial Law, the board of directors is responsible for determining amounts of executive compensation. The general shareholders' meeting, usually held once a year, must in turn approve the amounts (*Nihon Keizai Shinbun*, 4/20/96). However, since the general shareholders' meeting approves only the upper limit for the amount of total compensation for *all directors*, the board customarily assigns to the top executive, most likely the president, the responsibility of distributing the total amount among all directors.

In most cases, the top executive compensation consists of cash salary, usually paid monthly, and cash bonus, usually paid annually. The amount of salary is commonly determined based upon the salary of a non-director manager (Employment System Research Center reported in *Nihon Keizai Shinbun*, 4/20/96). For example, in average terms, the chairman earns 420 percent of a non-director manager's annual salary, the president on average 360 percent, a vice president 310 percent, a senior managing director 240 percent, a managing director 200 percent, a director 160 percent, and an statutory auditor 150 percent.[12] Also, around 70 percent of the firms surveyed by Employment System Research Center said that they review and adjust the amount of executive salary every year, and the revision is based upon such factors as firm performance, industry standards and a percentage increase for employees' salary.

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[12] In order to maintain independence, compensation for statutory auditors is determined at an auditors' meeting.

In contrast to the cash salary, the amount of bonuses paid to directors is based almost entirely on firm performance, especially the amount of after-tax profit (*Nihon Keizai Shinbun*, 4/20/96). Most firms view the total amount of executive bonus as an appropriation of the profit and decide on the amount based upon such factors as the level of achievement of performance goals and the actual amount of profit. The Commercial Law requires that such amount be approved by the general shareholders' meeting before an amount of individual bonus is determined. The individual amount is determined by considering such factors as the rank and individual performance. As in the case of directors' salary, top executives normally decide individual bonus amounts. This is the reason why some argue there is not enough oversight and control by shareholders on executive compensation decisions (e.g., *Nihon Keizai Shinbun*, 4/20/96).

The following table is a result of a survey conducted by a private think-tank Seikei Kenkyu Jo in 1995.[13] It shows average amounts of salary and bonus earned by each position for the firms listed on the first section of Tokyo Stock Exchange. It also shows percentage changes in salary and bonus from the previous year.

[13] Seikei Kenkyu Jo also annually publishes *Yakuin no Hoshu, Shoyo, Nenshu*. It contains amounts of salary and bonus for over 200 large and small firms in Japan. Unfortunately, this list does not disclose the names of the firms included, and therefore, it is not possible to match the data with data on firm characteristics or performance. It also publishes *Nihon no Keieisha no Shotoku*. It provides amounts of earned income, imputed from amounts of tax paid, for top executives of all listed firms in Japan. This list is published every four to five years, and the entries are often limited.

Salary and bonus paid by the firms listed on Tokyo Stock Exchange's 1st Section (1995)

Source: Seikei Kenkyu Jo

Title	N	Annual Salary (in '000s yen)	%change	Annual Bonus (in '000s yen)	%change
Chairman	22	34,080	1.55	6,090 (8,370)	-0.18
President	38	31,440	1.05	5,170 (7,870)	-4.86
Vice President	10	26,280	1.81	5,590 (6,210)	-6.37
Senior Managing Director	28	20,040	1.27	3,670 (5,410)	-1.79
Managing Director	38	17,520	2.70	3,020 (4,590)	-7.26
Director (employee)	37	12,360	0.45	4,320 (4,990)	-1.27
Director	7	16,200	2.83	2,650 (4,650)	1.86
Auditor	38	14,640	0.87	1,500 (3,360)	-13.3

* The amounts in parentheses are average amounts of annual bonus excluding zero-bonus observations.

Note that annual bonus accounts for approximately 15 percent of annual salary for all ranks, suggesting that a significant portion of compensation can be subject to fluctuations in firm performance. Excluding the zero-bonus observations, this percentage goes up to 25 percent.

The details of top executive compensation for Japanese firms, such as an amount of salary and bonus paid to each individual director, are not reported to the public because firms are not required to disclose such information. They are only required to provide information on total salary and bonus earned by all directors (Kato [1997]).

Chapter 3: Review of Prior Research

In this chapter, I provide a review of the prior research done on the issues of corporate governance and executive compensation. I first review the literature on the corporate governance for U.S. firms, most of which focus on the effectiveness of certain governance structures in reducing the agency problem.

I then summarize the effectiveness of Japanese styles of corporate governance. Here the focus is on the effects of certain governance mechanisms on the likelihood of some disciplinary events, such as top executive turnover and appointment of outside directors on the board.

Finally, I review prior studies that focus on the association between the compensation and firm performance to determine whether compensation contracts are used at all to motivate and discipline top executives in Japan.

3.1. Corporate governance research: evidence from U.S. firms

Prior studies on corporate governance mostly focus on the effectiveness of specific characteristics of board of directors and ownership structures in reducing the agency problem as it relates to shareholder-manager conflicts (e.g., Hart [1995]). The agency problem arises where a "complete contract" between the manager and shareholders is not feasible and the manager has more information about the firm than do shareholders (e.g., Coase [1937], Jensen and Meckling [1976], Fama and Jensen [1983a&b]). An effective governance mechanism can mitigate the agency problem because it can 1) enhance direct control by shareholders to monitor and discipline the managers, 2) help design effective compensation contacts for the manager to act in the interests of the shareholders, and 3) foster indirect control provided through capital market discipline, such as takeovers and proxy fights (OECD [1996]).

Three common sources of corporate governance are internal control, i.e., the board of directors, external control, i.e., takeovers and proxy fights, and managerial incentive contracts, i.e., managerial ownership and compensation contracts (OECD [1996]). The board of directors is viewed as a primary means for shareholders to exercise control on top management (e.g., John and Senbet [1998]). Managerial ownership and compensation contracts tied to firm performance are presumed to ameliorate the agency problem by aligning the interests of the managers and those of shareholders (Jensen and Meckling [1976]

and Fama [1980]). When other forms of governance fail, shareholders resort to a takeover or proxy fight to remove the incumbent management.

Researchers study the effectiveness of the board of directors as a monitoring device by examining the association between the board structure and firm performance, and board structure and its ability to discipline poorly performing managers, i.e., CEO turnover.

Thus far, researchers have found mixed evidence on the effect of outside directors on firm performance and/or shareholder wealth. For example, Rosenstein and Wyatt (1990) show that stock prices react positively to the appointment of an outside director on the board. This suggests that shareholder wealth is affected by the proportion of outside directors on the board. On the other hand, Yermack (1996) does not find any association between the percentage of outside directors on the board and firm performance.

Some argue that smaller boards are more effective in monitoring the managers. The argument here is that as the board becomes larger, the incremental cost associated with poor communication among directors and less effective decision-makings outweighs the potential benefits, such as increased monitoring capacity (e.g., Jensen [1993]). Yermack (1996) empirically investigates this issue using a sample of 792 firms for the 1984-1991 period and finds that there is an inverse relation between firm value and board size. In contrast, Hermalin and Weisbach (1991) do not find any significant relations between characteristics of board composition and firm performance. Therefore,

the empirical evidence to date on the effectiveness of the board as it relates to independence and size is mixed in the U.S.

By studying the association between the board composition, i.e., the dominance of outside directors, and the likelihood of non-routine CEO turnovers for the 1974-1983 period, Weisbach (1988) finds that the likelihood of turnover is significantly related to firm performance when the board is dominated by outsiders, controlling for firm size and industry. He does not find any significant relation for firms with insider-dominated boards. In addition, Weisbach finds that excess returns are positive at the time of CEO turnover announcement for firms with outsider-dominated boards, while they are close to zero for firms with insider-dominated boards. He argues that these results are consistent with the hypothesis that outside, and possibly independent, board of directors are more effective in monitoring the management.

A number of researchers study the ownership structure to examine whether firms with higher ownership by insiders (managers) indeed have a better alignment of interests between the managers and shareholders. Agency theory predicts that when there is better alignment, the agency problem is reduced, and the firm performance will be improved. Morck et al. (1988) and Holderness and Sheehan (1999), among others, show that as ownership by board of directors rises, firm value measured by Tobin's Q first increases due to the interest alignment effect between managers and shareholders, then decreases as the entrenchment effects starts to dominate. However, more recent work by Cho (1998) and Himmelberg et al. (1999) point out the endogeniety of the inside

ownership and firm performance, and question the previously found results that managerial ownership affects firm performance. Therefore, it appears that we need to wait for further study on the association between inside ownership and firm performance.

Guercio and Hawkins (1999) study the shareholder proposals of the largest pension funds from 1987 to 1993 and find that firms targeted by these funds are more likely to experience subsequent restructuring, such as asset sales, and corporate control changes, such as top management turnovers. This result suggests that large shareholders, such as pension funds, are successful in affecting the corporate governance of the firms that they own.

Recently, researchers have begun focusing on the association between the executive compensation contracts and corporate governance structures to see whether certain structures can affect the compensation designs.

Using proprietary data on CEO compensation for 205 public firms in the U.S., Core et al. (1999) find that board and ownership structures are associated with the *level* of CEO compensation controlling for the standard determinants of compensation.[14] The standard determinants used are firm performance, firm risk, and the firm's demand for a high quality CEO, as proxied by firm size, market-to-book ratio and industry. In particular, they find that CEO compensation is negatively associated with the percentage of insider directors and positively associated with board size, the percentage of outside directors appointed by the

[14] They obtain the data from a major compensation consulting firm.

CEO and the percentage of "gray" outside directors.[15] They also find an inverse relation between the level of compensation and the percentage of directors over 69 years old, the percentage of outside directors who serve on more than three boards, and that compensation is lower when the CEO is also chairman of the board. However, they do not find any significant association between compensation level and the percentage ownership per outside director. In order to confirm their findings, Core et al. also examine the association between the predicted component of compensation related to the board and ownership variables (called "predicted excess compensation") and subsequent operating and stock performance for the firms. The result shows that there is a negative correlation between these two variables, which suggests that the estimated coefficients on the board and ownership variables from the compensation regression are indications of the relative effectiveness of various governance structures in reducing the agency problems.

Based upon the above results, Core et al. conclude that the board and ownership structures affect the degree to which CEOs receive compensation in excess of the equilibrium level implied by the standard determinants. They also conjecture that the excess compensation paid to CEOs is a "manifestation of other contracting inefficiencies within the firm that lead to poorer subsequent performance" (page 405). It is interesting to note that they find that the board and

[15] A gray director is defined as an outside director if he or his employer receive any payment from the company in addition to the compensation that he receives as a board member.

ownership structures more consistently predict future performance as measured by accounting variables than that by stock returns.

There is limited research available investigating the effect of governance structures on the *sensitivity* of executive compensation to firm performance. The only research I could find is Cosh and Hughes (1997) studying a sample of firms belonging to the U.K. electrical engineering industry for 1989-1994. The authors investigate executive compensation and dismissals, and their relations to the presence of institutional shareholders and the proportion of non-executive directors on the board. The authors find executive pay is positively associated with firm performance and firm size, although the latter has greater explanatory power. They also find the likelihood of executive dismissal is inversely related to firm profitability and firm size. They find no evidence to suggest that the presence of institutional shareholders or non-executive directors affects the sensitivity of executive pay to firm performance. Also, they did not find significant impact of the presence of institutional shareholders or non-executive directors on the likelihood of executive dismissals. Cosh and Hughes (1997) do not offer any explanation for the latter result.

3.2. Effectiveness of Japanese style of corporate governance – empirical evidence

A number of research papers provide empirical evidence to support the effectiveness of the Japanese governance mechanisms. Kaplan (1994)

examines the association between firm performance and "standard" and "nonstandard" turnover of top management for 119 Japanese firms from 1980 to 1988. "Nonstandard" turnover is defined as a presidential turnover, in which the president does not become the chairman, while "standard" turnover is the one in which the president subsequently becomes the chairman. Kaplan (1994) finds that the likelihood of "nonstandard" turnovers is negatively related to performance measures, i.e., negative earnings dummy and stock returns, controlling for executives' age and tenure, while that of "standard" turnovers is only related to age and tenure of top executives. He also compares the results to turnovers of U.S. CEOs and finds that the overall sensitivity of the "nonstandard" turnover to stock returns in Japan is similar to that of U.S. CEO turnover. Based upon these findings, Kaplan (1994) concludes that the existing governance mechanisms in Japan effectively penalize managers who are performing poorly in terms of earnings and stock returns.

Although Kaplan (1994) investigates the overall sensitivity of top executive turnover to firm performance in Japan, he does not specifically address the roles of various governance mechanisms in this disciplinary process. Kaplan and Minton (1994) investigate the sensitivity in the likelihood of "outside" director appointments to firm performance in relation to the strength of the governance mechanisms in Japan. Using data on 119 publicly traded Japanese firms for the 1980-1988 period, they find that the likelihood of appointments of outside directors significantly increases with poor stock performance, and that of a bank director increases with reported accounting earnings losses. They also show that

the likelihood of bank directors appointments increases if a firm has greater bank larger borrowings, while that of a corporate director appointment increases if a firm has more concentrated shareholders or it is affiliated with a *keiretsu*. Additionally, they compare the above results to those for large, non-financial U.S. firms over the same period, and find that appointments of directors affiliated with large blockholders in the U.S. are roughly as sensitive to corporate performance as outside appointments for Japanese firms are. These results suggest that the relationship-based governance mechanisms play monitoring and disciplinary roles in Japan.

To add more validity to the above conjecture, Kaplan and Minton (1994) further show that incumbent top executive turnover substantially increases in the year of an outside director appointment, while the results for U.S. firms are somewhat weaker. They also report some improvement in the performance of the Japanese firms after outsiders were appointed to their boards. Based upon these results, the authors conclude that the appointment of outside directors is another evidence that the Japanese style of governance, based upon the relationships, is effective in disciplining poorly performing managers. They also claim that these relationships may function as a substitute for the more "market-oriented" governance mechanism in the U.S.

Kang and Shivdasani (1995) investigate the role of governance mechanisms during top executive turnovers. Using data on 270 Japanese firms for the 1985-1990 period, they show that the sensitivity of non-routine turnover to earnings performance measures is significantly higher for firms with main-bank

ties than for firms without such ties. The authors attribute this result to the main banks playing an important governance function. They also show that the likelihood of outsider succession is higher for firms with large block shareholders and main-bank ties, suggesting that these governance mechanisms, especially that provided by large block holders, is effective in replacing top executives with outsiders. Also, the authors find that the unconditional likelihood of non-routine turnover and of outside succession is lower for *keiretsu* firms, suggesting that *keiretsu* firms are likely to use other means to discipline managers and to "depart from the policies of outgoing presidents". Finally, they find that performance of firms following non-routine turnover improves in terms of return on assets, excess returns, and negative income, suggesting that "presidents are disciplined only when their removal is expected to rectify the poor performance". Based upon these results, the authors conclude that banks and corporate shareholders play "an important monitoring and disciplinary role" in Japan.

The prior research I cite examines the role of the main banks, corporate shareholders and *keiretsu* affiliation acting as monitors and/or a force behind disciplinary actions. Kang and Shivdasani (1999) focus on the governance structures of independent firms, i.e., firms without strong ties to a main bank, to see if there exists an alternative governance mechanism for these firms. They study the ownership and board structures of the independent firms for 1992 and compare them against those of industry and size-matched firms. They categorize a firm as "independent" if it has no bank debt outstanding at the end of 1992 fiscal

year, and find 178 (11 percent) of such firms out of 1,651 firms listed in the first section of Tokyo Stock Exchange.

The authors find that independent firms have significantly higher levels of managerial equity ownership, higher ownership by banks and smaller boards than do bank-affiliated firms. The mean (median) ownership by the board of directors is 4.03 (1.5) percent for independent firms, while that by bank-affiliated firms is 2.89 (0.2) percent. A bank's ownership is on average 15.5 percent for independent firms, while it is 14.12 percent for the bank-affiliated firms. Finally, independent firms have a mean (median) board size of 17.95 (17), whereas bank-affiliated firms have a mean (median) of 19.55 (18) directors on the board. The authors also compare firm performance for the two groups and find that the average return on assets is significantly higher for independent firms than for bank-affiliated firms, controlling for firm size, standard deviation of daily stock returns, and the fraction of long-term debt outstanding. The authors conclude that these results are consistent with the "incentive-substitute" hypothesis, which argues that for independent firms, managers have stronger incentives to maximize firm value due to their higher stake in their firms and, as a result, the independent firms need to rely less on other governance mechanisms such as main banks. Therefore, the authors argue, independent firms have little or no need for bank financing.

Although the above studies provide evidence that the relationship-based governance mechanisms are effective in precipitating appointment of outside directors and/or turnover of top executives, they do not address the role of the

governance mechanisms in designing executive compensation contract, also a potentially effective means of motivating and disciplining management. U.S. evidence shows that executive compensation design is more effective in disciplining management than the ex-ante threat of dismissal or increased oversight by outside directors because compensation directly affects executives' wealth. In addition, as anecdotal evidence suggests, many firms are known to *reduce* executive salary and bonus as a punishment when their financial performance deteriorates. Assuming the managers are risk averse, i.e., their utility curve is concave, one-dollar decrease in compensation hurts more than one-dollar increase.

Furthermore, I argue that the threat of dismissal for top executives cannot be effective if the actual dismissal rarely takes place. Kang and Shivdasani (1995) report that of all 174 turnover events identified in the 1,350 firm-years, only 42 cases are coded as non-routine by the authors, i.e., the president is no longer on the board of directors, which makes the unconditional annual likelihood of such turnover 3.1 percent. I argue that many firms adopt other disciplinary measures, such as salary and bonus cut and reduction on perquisite spending, before resorting to such extreme disciplinary measures as non-routine turnover. This may be the reason why the previous study find the turnover frequencies to be relatively too low to be economically significant.

3.3. Executive compensation for Japanese firms

There is limited research investigating the association between top executive compensation and firm performance for Japanese firms. Kaplan (1994) collects data on the amounts of total salary and bonus earned by *all* directors of 119 large Japanese firms for 1981-1984 and examines the association between the total compensation and firm performance. He measures firm performance by stock return, sales growth, changes in pretax income deflated by assets and the negative income dummy. Kaplan (1994) finds that 1) the *change* in the total compensation is significantly associated to all four measures of firm performance if used in an individual regression; 2) in the multivariate regression including all four measures, the negative pretax income and the change in pretax income deflated by assets have the greatest explanatory power. He also compares the results from the Japanese regressions against those of regressions on U.S. CEOs and finds that there is no significant differences in the sensitivity of executive compensation to firm performance between Japanese and U.S. firms. His U.S. sample contains the amounts of salary and bonus paid to executive officers of 110 large U.S. firms in 1987. Based upon these results, Kaplan (1994) concludes that the existing governance mechanisms in Japan motivate managers to increase current cash flows and discipline them in case their performance deteriorates. Citing the result that top executive turnover and compensation in Japan are more sensitive to negative earnings than in the U.S., he conjectures that the main banks in Japan have the dominant role in monitoring and disciplining Japanese firms.

Using a different data set from Kaplan (1994), Kato and Rockel (1992) investigate the determinants of top executive compensation for Japanese firms. They use a proxy for the amount of *individual* top executive compensation imputed from the total amount of income tax paid in 1985 by each executive of the 599 largest firms in Japan. The amounts of income tax paid are reported in *Jinji Kanri Soran Special Issue* published by Toyo Keizai Inc. As the authors admit, the proxy they use may suffer from potential biases, which can be caused by the inclusion of income other than the compensation received and/or income tax loopholes utilized differently by each individual. Despite this concern, the authors claim this is the best proxy available, arguing that it is virtually impossible to find loopholes for salaried income under the income tax system in Japan.[16] They also argue that it is unlikely that top executives earn a significant portion of their income from sources other than the firms they work for.[17] They report the results of regressions of log of the compensation proxy (the level) on firm performance and size, as well as other human capital variables, such as tenure and education and compare the results against those obtained by U.S. regressions.

They find that the association between compensation and firm performance is stronger for U.S. firms than for Japanese firms. They also find that firm size, as proxied by the number of employees, is the most significant determinant of compensation, and that the tenure is significantly positively related to the level of compensation for both countries. These results are consistent with a human capital theory, which predicts that an executive with more experience

[16] Aoki (1990a) also argues that this is the case.

(tenure) and higher job complexity (proxied by firm size) will earn a higher level of compensation. Because they only have one-year of data, the authors are unable to address the issue of potential bias "caused by some unobservable firm and/or personal characteristics that may be correlated with executive compensation".

Kato (1992) uses the same data set as in Kato and Rockel (1992) and investigates the effect of *keiretsu* affiliation on the level of top executive compensation. He finds that top executives of *keiretsu* firms earn 21 percent less than those of independent firms, after controlling for firm performance and human capital variables. He suggests that this result is consistent with the hypothesis that for *keiretsu* firms, main bank monitoring is more effective in controlling management, and, as a result, managerial opportunistic behaviors are less likely to occur for *keiretsu* firms. The managerial opportunistic behaviors include, among others, top executives paying themselves higher compensation. In addition, Kato (1992) finds that the top executive compensation for *keiretsu* firms is more sensitive to the amount of capital investment than for independent firms. This result is consistent with the hypothesis that managers of *keiretsu* firms are more encouraged to invest in capital assets and therefore grow in size so that the interests of shareholders, especially the main banks, are satisfied. Weinstein and Yafeh (1995&1998) make a similar argument that unlike independent firms, *keiretsu* firms seek to maximize a weighted average of the objective functions of major shareholders, which normally are other member firms and its main bank. While other shareholders are interested in maximizing accounting income, the

main bank is more interested in maximizing profits from the loans, which is an increasing function of the borrower firm's use of capital.

Ang and Constand (1997) investigate the sensitivity of top executive compensation to firm performance for Japanese firms to test whether Japanese executives are rewarded for performance in the short- or long-run. They collect data on the total amounts of two components of compensation, i.e., salary and bonus, paid to all boards of directors for 364 firms for a thirteen year period from 1980-1992. The authors find that 1) only the bonus, but not salary, is sensitive to an increase in short-term (one year) share prices, while both salary and bonus are sensitive to changes in longer-term (13 years) share price and sales growth; 2) the association between the bonus and the changes in short-term share prices exists only in the years in which share prices increase, but not in the years of share price declines; 3) firms with lower sensitivity of compensation to performance achieve on average *higher* returns; 4) the sensitivity of compensation to performance is higher for *keiretsu* firms than for non-*keiretsu* firms; 5) the changes in salary are significantly related to the changes in lagged earnings and current share price, while the changes in bonus are significantly related to changes in lagged share price, lagged income and the current sales growth.

There is a limitation with the use of aggregate data to make inferences about pay-to-performance sensitivity for executives in Japan. First, the aggregate amount of total compensation does not usually include employee portions of

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[17] The authors come to this conclusion after interviews with scholars and practitioners.

salaries and bonuses paid to rank and file directors, called "*hiratori*".[18] These employee-directors earn director compensation as well as a salary as an employee. Therefore, averaging the aggregate amount by the number of directors is likely to underestimate the compensation amount per director. Also, the use of the aggregate or average amounts may not be accurate in estimating the sensitivity of pay to performance for individual executives because there appears to be different degrees in sensitivity of pay for performance among different ranks of directors. For example, anecdotal evidence suggests that in the time of poor financial results, firms cut executive salaries with the biggest percentage cut for president, the next biggest cut for executive directors, and so on.[19]

This dissertation contributes to the literature by imputing the amounts of compensation paid to *individual* executives from the amounts of income tax paid by top executives. This method is expected to overcome the problem associated with the use of averaging the reported total compensation amounts. Moreover, I collect data on the income tax amounts for the five-year period from 1992 to 1996. With this data, I can capture both the cross-sectional and time-series variations in the association between compensation and the governance variables.

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[18] The data are reported in *Yuka Shoken Hokokusho*, and this is equivalent to a Form 10-K in the U.S.

[19] All Nippon Airways announced on May 28, 1998 that it would cut salaries of their president and vice presidents by 20 percent and of senior managing directors and managing directors by 15 percent because of declining profits. *(Kyodo World Service*, 5/28/98)

Chapter 4: Hypotheses Development

In this chapter, I develop hypotheses regarding the association between top executive compensation and governance structures for Japanese firms, and the effect of various governance structures on the sensitivity of compensation to firm performance.

I first develop hypotheses concerning the ability of certain governance mechanisms in reducing the level of compensation. I then develop two competing hypotheses, namely the "incentive-substitute hypothesis" and "incentive-complement hypothesis", on the effects of various governance structures on the sensitivity of compensation to firm performance. Finally, I develop hypotheses on the association between top executive compensation level and the level of inside ownership, and the association between the sensitivity of compensation to firm performance.

4.1. Hypotheses on the effect of governance structures on the level of compensation

In this section, I develop hypotheses pertaining to the effectiveness of the relationship-based governance mechanism on the level of top executive compensation. If, as argued by Aoki at al. (1994) and Sheard (1994), the main bank can effectively monitor the management of a borrower firm, then the level of top executive compensation is expected to be lower as the firm's relationship with the main bank becomes stronger. This association is expected because the main bank monitoring helps reduce the probability of managerial opportunism, one of which can take the form of paying themselves in excess of what is implied by the standard determinants of pay. Thus, my first hypothesis is on the relation between the top executive compensation and leverage, as measured by the ratio of total debt to total assets.

Hypothesis 1: The level of top executive compensation decreases as leverage increases, after controlling for the standard determinants of pay.

If, as argued by Berglof and Perotti (1994), the *keiretsu* system provides effective monitoring of the management of the member firms, then the level of top compensation is expected to be lower for *keiretsu* firms than for non-*keiretsu* firms. The reasoning for this is essentially the same as in the case of the main bank monitoring, i.e., the more effective the monitoring, the lower the level of

compensation. Thus, my second hypothesis pertains to the differential levels of top executive compensation between *keiretsu* and non-*keiretsu* firms.

Hypothesis 2: The level of top executive compensation is lower for keiretsu firms than for non-keiretsu firms, after controlling for the standard determinants of pay.

My third hypothesis relates to the effectiveness of monitoring by outside directors. If a main bank appoints a director to the board of its borrower firm when it wants to monitor the firm's performance more closely, then the level of top executive compensation is expected to be lower as the percentage of outside directors increases. Note that it is crucial here to control for firm performance since, as argued by Kaplan and Minton (1994), the likelihood of an outsider appointment increases as the receiving firm suffers from poor stock and earnings performance.

Hypothesis 3: The level of top executive compensation decreases as the percentage of outside directors on the board increases, after controlling for standard determinants of pay.

4.2. Hypotheses on the effect of governance structures on the sensitivity of compensation to firm performance

In this section, I develop a number of hypotheses regarding the association between the sensitivity of top executive compensation to firm performance and the governance mechanisms. In particular, I consider the complementary or substitutive nature of the top executive compensation contracts and other governance mechanisms. To this end, I develop two competing hypotheses for each governance mechanism.

I first hypothesize that the sensitivity of top executive pay to firm performance is *lower* for *keiretsu* firms than for non-*keiretsu* firms. This is expected because managers of *keiretsu* firms are already monitored and disciplined by the threat of dismissal, which can be forced by a coalition of all members, and, therefore, the shareholders do not need to tie the top executive compensation to firm performance to provide additional incentives – "incentive-substitute hypothesis". The predicted association is also consistent with the notion that because shareholders of a *keiretsu* firm have more information available on managerial performance, they rely less on output-based performance measures than on input-based measures to compensate the top executive. *Keiretsu* firms are known to have a greater flow of information among managers of member firms through mutual exchanges of goods and services and so-called "presidents' clubs", where top executives of core member firms meet regularly to discuss overall strategies (e.g., Nakatani [1984]). In this sense, the monitoring by the main bank and *keiretsu* can to some degree substitute for compensation design more sensitive to firm performance. The assumption here is that management's effort level is less than perfectly correlated with firm

performance, i.e., firm performance is a noisy measure of top executive performance.

Hypothesis 4a: The sensitivity of top executive compensation to firm performance is lower for keiretsu firms than for non-keiretsu firms, after controlling for standard determinants of pay.

Alternatively, it can be argued that the top executive compensation for a *keiretsu* firm is tied more strongly to firm performance. Since a *keiretsu* firm generally relies more on bank loans, its main bank has greater incentive to monitor the management because it has a greater amount of loans to protect. Under this scenario, the main bank of a *keiretsu* firm is expected to force the management to adopt a compensation design more sensitive to firm performance, especially in relation to earnings and/or interest coverage, to motivate and discipline the management. Also, through a coalition threat of member firms, the *keiretsu* system can exercise greater power over management of any one member firm. Therefore, I conjecture a *keiretsu* firm is likely to tie its top executive compensation more strongly to firm performance in order to discipline its managers. In this sense, I argue that the riskier compensation contract is used to complement the monitoring by the main bank and other member firms – "incentive-complement hypothesis".

Hypothesis 4b: The sensitivity of top executive compensation to firm performance measures is higher for keiretsu firms than for non-keiretsu firms, after controlling for standard determinants of pay.

Next, I hypothesize that when firms borrow more, the lenders including the main bank have greater incentive to monitor the management and, as a result, the firms tend to use top executive compensation tied more strongly to firm performance. They do so to complement other means of institutional monitoring, as defined "interim monitoring" by Aoki et al. (1994). Thus,

Hypothesis 5a: The sensitivity of top executive compensation to firm performance increases as the leverage increases, after controlling for standard determinants of pay.

In contrast, as in the case of *keiretsu*, if more highly leveraged firms are already monitored effectively by the lending institutions, then they rely less on incentive contracts for top executives to motivate and discipline. If this is the case, I would expect the sensitivity of top executive compensation to decrease as the leverage increases.

Hypothesis 5b: The sensitivity of top executive compensation to firm performance decreases as the leverage increases, after controlling for standard determinants of pay.

As for the effectiveness of outside directors on the boards, I hypothesize that when firms have a higher proportion of outside directors, these outside directors collectively can exercise greater power over the top executive and, as a result, they can force riskier compensation contracts on the top executives. If this is the case, I expect the sensitivity of top executive compensation to firm performance to increase as the percentage of outside directors on the board increases.

Hypothesis 6a: The sensitivity of top executive compensation to firm performance increases as the percentage of outside directors on the boards increases, after controlling for standard determinants of pay.

On the other hand, if these outside directors are effective in monitoring the management, then the firms need to rely less on the incentive contracts to motivate and discipline the management. If this is the case, then I expect the sensitivity of top executive compensation to firm performance to decrease as the percentage of outside directors on the board increases.

Hypothesis 6b: The sensitivity of top executive compensation to firm performance increases as the percentage of outside directors on the boards increases, after controlling for standard determinants of pay.

4.3. Hypotheses on the effect of managerial ownership on the level of compensation and the sensitivity of compensation to firm performance

The final hypotheses relate to the association between the level of managerial ownership and the level and sensitivity to firm performance of top executive compensation. Salancik and Pfeffer (1980) and Gomez-Mejia and Tosi (1987) among others suggest that managers are insulated from opposition and threats of removal when they have significant control of the firm by holding a great number of shares. If this is the case, then I can infer that it is easier for a top executive who owns a greater proportion of the shares to entrench himself and, as a result, to design less risky compensation for himself. Therefore, I hypothesize that the level of top executive compensation is positively associated, and the sensitivity of pay to performance is negatively associated, with the level of managerial ownership. Here, I assume that the argument of management control applies perhaps more strongly to Japanese firms than to U.S. firms because typical Japanese boards consist primarily of insiders, which usually means even less opposition. The above associations are predicted also because some of the firms with high levels of managerial ownership are family-owned or their top executives are also the founders, where top executives exercise significant control over decision-making. As a result, the top executives of family-owned firms are expected to pay themselves higher levels of compensation and to design their compensation to be less risky, i.e., less sensitive to firm performance. To the extent that family-owned firms are characterized by higher managerial

ownership, I would expect the level of managerial ownership will capture the effect of the higher power of top executives of family-owned firms. Hence, the seventh and eighth hypotheses are:

Hypothesis 7: The level of executive compensation increases as the level of managerial ownership increases, after controlling for standard determinants of pay.

Hypothesis 8: The sensitivity of pay to performance measures decreases as the level of managerial ownership increases, after controlling for standard determinants of pay.

Chapter 5: Data

In this chapter, I describe how I collect data for this dissertation, and discuss characteristics of the firms included in my sample.

5.1. Sample selection

Firms are included in the sample if they have complete consolidated data available on Compustat's Global Vantage database on year-end share price, consolidated annual net income, sales and assets for two consecutive years. This allows for the testing of current, as well as lagged firm performance in terms of accounting and stock-based performance measures.

I identify the names and addresses of top executives for each firm for each year using the 1993-1997 issues of *Yakuin Shikiho*, published annually by Toyo Keizai Inc. This directory provides detailed personal data, such as name, home address, title, birthday, date of assuming the position, and hobby, for all board members and statutory auditors of all listed firms. I include executives who are equal to and above the rank of president ("*shacho*"). I did this because, as

mentioned earlier, despite the president usually being the highest decision-maker, the chairman sometimes has greater authority than the president (Kaplan [1994]). As a result, my sample includes a few vice charimen ("*fuku kaicho*") and honorable chaimen ("*meiyo kaicho*"), although most of the people identified are presidents and chairmen ("*kaicho*").

Subsequently, I obtain data on income tax amounts paid by the executives for each year from the 1992-1996 issues of *Kogaku Nozeisha List* (List of High Income Tax Payers) published by Tokyo Shoko Research. This list provides an actual amount of income tax paid by an individual, as long as his/her tax payment exceeds ¥10 million, or approximately $100,000. It also provides each individual's address and, sometimes, occupation. I match the names and addresses of the executives obtained from *Yakuin Shikiho* with those in *Kogaku Nozeisha List* to obtain the actual amounts of tax that they paid each year. The entries are arranged by location of municipal taxation offices, and within each location, they are ranked by tax amount. The list has data on more than 125,000 individuals in the 1993 edition.

I estimate a total amount of compensation earned by each individual each year using the following algorithm, which is essentially the same as in Kato and Rockel (1992). I first add back the tax credit amounts applicable each year, i.e., ¥3.9 million for the 1992-1994 period and ¥6.6 million for the 1995-1996 period to the tax amount.[20] I divide the amount obtained by the marginal tax rate of 50 percent. For example, if an executive pays ¥27,000,000 in tax in 1993, then his

[20] These different amounts are necessary because the income tax law was revised in January 1995.

estimated income is ¥61,800,000 or (¥27,000,000 + 3,900,000) / 0.5. Although Japan has adopted a progressive income tax system, I apply the highest tax rate of 50 percent to everyone in my sample for the following reason. If anyone is on the list, he/she has paid a minimum of ¥10 million in tax, which translates into a minimum pretax income of ¥27.8 million, which is above the threshold of ¥20 million for the highest bracket.

There are limitations to the application of this formula. First, the amount obtained is an estimate of total income, i.e., it includes not only salaries and bonuses earned by the individual, but also other income, such as dividends, capital gains, inheritances, and so on. Kato and Rockel (1992) defend their use of this methodology by quoting anecdotal evidence suggesting that Japanese top executives do not earn a significant portion of their income from sources other than their firms. Nevertheless, the inclusion of dividend income may pose a problem especially in testing my hypothesis regarding the association between compensation and level of inside ownership. This is the case because higher inside ownership by directors usually means higher income for them since they receive higher dividend payments, regardless of whether they have control over the board or not. In order to mitigate this problem, I adjust my compensation proxy for amounts of dividends received by executives (see the next section for details).

Second, this method ignores all potential of loopholes for income tax computations. If they are in fact available but applicable differently to each individual, then the application of the same tax rate to back out the amounts of

incomes will lead to erroneous amounts. However, Aoki (1988) and Kato and Rockel (1992) argue that it is virtually impossible for salaried workers to find loopholes for income tax during my sample period.

The data on outside directors and the percentage of shares owned by the board of directors are obtained from *Yakuin Shikiho*, and the data on the percentage shares owned by foreign investors are obtained by *Kaisha Shikiho*, also published annually by Tokyo Keizai Inc. Ideally, I would like to have data on the percentage of shares owned by *each* top executive, not by all board members combined, since I am interested in the top executive's power over the board in determining his compensation. For these data, I would need to refer to *Yuka Shoken Hokokusho*, similar to Form 10-K filed in the U.S.[21]

The data on *keiretsu* affiliation are obtained from the 1990 edition of *Industrial Groupings in Japan* published by Dodwell Marketing Consultants. Dodwell classifies all listed firms in Japan either as *keiretsu* or non-*keiretsu* using such criteria as the proportion of common stock owned by ten largest shareholders, the amount of total borrowing and the amount of borrowing from main banks. Dodwell identifies the eight largest *keiretsu*, namely Mitsubishi, Mitsui, Sumitomo, Fuyo, Daiichi Kangyo Bank (DKB), Sanwa, Tokai and Industrial Bank of Japan (IBJ).

I obtain a total of 1,156 firm-year observations.

5.2. Descriptive statistics

[21] I could not obtain these data for this dissertation.

Table 1 provides the descriptive statistics for each of the variables. The mean level of compensation is ¥100,358 million, or US$982,169 using the 1994 average exchange rate of ¥102.18 to the dollar. This number seems greater than those reported in the previous papers, e.g., the mean pay per director is US$63,900 in Kaplan (1994), and the mean is ¥44.41 million in Kato and Rockel (1992). I believe this is partly due to the fact that these authors use older data, both from the 1980's. It can also be caused by Kaplan's method of averaging the total compensation, which, as mentioned before, suffers from a downward bias. In order to correct for the right skewness of the distribution, I use the natural log of compensation, LNCOMP, in my regressions.

For the performance measures, I use return-on-assets, ROA, and annual stock return, RET. I choose these two variables because Japanese managers and shareholders appear to be most interested in accounting income. For example, a daily newspaper *Sankei Shinbun* (4/25/1997) reports that Nomura Securities announced it would cut directors' bonus down to zero due to its ordinary income being in the red. Separately, *Nihon Keizai Shinbun* (6/21/1998) reports that Fujitsu Ltd. announced a new executive bonus plan that allocates 0.4 percent of its after-tax net income to the bonus pool. Also, prior research shows that top executive compensation is associated with ROA as well as annual stock returns (Kaplan [1994] and Hwang et al. [2000]). The net income is deflated by the total assets to control for scale differences.

The mean return-on-assets, ROA, is 1.5 percent, while the mean annual stock return, RET, is 0.7 percent. It is interesting to note that the median annual stock return for this sample is –2.6 percent, which suggests that more than a half of the sample observations have negative stock returns. In order to control for size and growth opportunities, I use the natural logarithm of sales, LNSALE, and market-to-book ratio, MB, measured at the beginning of each year, respectively. I use the natural logarithm for sales because this variable is highly right skewed. Rosen (1982) and Smith and Watts (1992) among others argue that larger firms with greater growth opportunities and more complex operations will demand more highly talented executives and, therefore, pay higher equilibrium compensation. The means of LNSALE and MB are 13.29 and 2.46 respectively.

I consider age, tenure and the level of education to proxy for human capital because some, e.g., Agarwal (1981) and Leonard (1990), argue that the level of compensation is related to these variables. The argument here is that an executive with a greater amount of human capital is expected to perform better, and, therefore, be paid more. The mean age of my sample executives is 66 years, and the mean tenure is 5.39 years, which is similar to that obtained by Kaplan (1994). Due to the lifetime employment system, employees generally stay with one firm until they retire, and the same principle applied to top executives. The education dummy is set to one if an executive has a bachelor's degree or higher, and zero otherwise, and in my sample, more than 82 percent of the executives have received higher education.

One of the governance variables is LEV, measured by the ratio of total liability to total assets. The mean of LEV is 0.654 with the standard deviation of .195. KR is a *keiretsu* dummy, which is one if a firm belonging to one of the eight financial *keiretsu* and zero otherwise. I use the classification done by Dodwell Marketing Consultants. About 54 percent of the firm-year observations are for *keiretsu* firms. The average number of outside directors, OUT, is 2.25. However, because of the high correlation between the number of directors and firm size, I consider two alternative measures to proxy for the effectiveness of monitoring by outsiders, the outside director dummy and the percentage of outsiders on the board. DOUT is an indicator variable, which is 1 if there is at least one outside on the board, and zero otherwise. POUT measures the percentage of outside directors on the boards. The mean POUT is 8.30 percent and its median is 3.85, which indicates right skewness. Finally, the level of ownership by management, OWN, is the percentage of total outstanding shares owned by *all* board members. The mean ownership is 2.17 percent with 32.6 percent being the highest.

In order to reduce the influence of outliers on my regression results, I eliminate observations with values greater than the 99 percentile level for the following variables: LNCOMP, COMP, RET, PEROUT, OUT, PEROUT, OWN and AGE. I also eliminate observations with values greater than the 99 percentile or smaller than the 1 percentile for the following variables: ROA, SALE, LNSALE and MB. This process leaves a final sample of 949 executive-year observations.

Chapter 6: Empirical Model and Results

In this section, I first discuss the empirical model used to test the hypotheses. I then discuss the results of the empirical tests. I also perform sensitivity tests to confirm some of the results.

6.1. Methodology

The existing theory and empirical evidence on determinants of top executive compensation posit that larger firms with greater growth opportunities demand more highly talented executives, and consequently pay higher equilibrium compensation (Rosen [1982] and Smith and Watts [1992]). Also, the agency theory predicts that the level of compensation is positively associated with firm performance. Firm risk, which measures the risk of its operating environment, as well as its information environment, can potentially influence the level of top executive compensation (Smith and Watts [1992] and Core et al. [1999]). Finally, the level of compensation is also expected to be associated with the executive's

human capital, such as age, tenure, and education (Deckop [1988] and Leonard [1990]). Therefore, my base model is as follows:

Compensation = f (human capital, size, growth opportunities, risk, firm performance)

Core et al. (1999) examine an association between the level of CEO compensation and the quality of firm's corporate governance using several variables to proxy for the governance quality of U.S. firms. In particular, they examine board-of-director characteristics, such as CEO/board chair identity, board size, the percentage of outside directors, and ownership structure, such as CEO ownership and the existence of an external blockholder who owns at least five percent of equity. I adopt their model in testing my hypotheses of the association between the top executive compensation and the governance structure for Japanese firms.

Compensation = f (human capital, size, growth opportunities, risk, firm performance, ***governance variables****)*

In order to test the effect of the institutional monitoring on the compensation design, or the riskiness of compensation, I also investigate interactions between the performance measures and the governance variables.

*Compensation = f (human capital, size, growth opportunities, risk, firm performance, governance variables, and firm performance*governnace variables)*

6.2. Empirical results

6.2.1 Correlations among variables

Table 2 shows pairwise correlations among the variables. There are high correlations (the correlation coefficient is 0.34) between the log of compensation and earnings-based performance measures, ROA, while the correlation between the log of compensation and stock-based performance is not high or significant. It is interesting to note that ROA and RET are significantly correlated but the correlation coefficient is only 0.09. Also, the log of compensation is significantly positively correlated with the size proxy, LNSALE, but significantly negatively correlated with risk, BETA. As for the governance variables, the log of compensation is negatively correlated with the *keiretsu* dummy (-0.16) and the outside director dummy (-0.09), but positively correlated with the level of managerial ownership (0.35). These univariate results are consistent with my expectations.

Table 3 shows the regression results. Model 1 is a base model without any governance variables. I also include a dummy variable, AGEOLD, to capture the

potential non-linear effect in the relation between executive pay and their age. This variable takes 1 if AGE is greater than 65 and 0 otherwise. The choice of the age 65 is somewhat arbitrary but nevertheless appears reasonable, given that some firms have set a mandatory retirement age of 65 for their top executives, i.e., the top executives retire in the year they turn 66 years old.

The coefficient on return-on-assets is positive (7.64) and significant (t-statistic=6.15), suggesting that a one percent increase in ROA increases a top executive's compensation by 7.94 percent (1 minus the exponential of 0.01 times 7.64). The coefficient on the contemporaneous stock return is positive (0.01) but statistically insignificant. The coefficients on the size proxy (LNSALE), the growth opportunity (MB) and the firm risk (BETA) all have the expected signs, but that on market-to-book ratio is not statistically significant. As for the human capital variables, the coefficient on tenure is positive (0.03) and significant (t-statistic=8.31), indicating that as a top executive gain one more year in his tenure, his compensation goes up by 2.63 percent. The coefficient on AGE is positive but not significant, while that on AGEOLD is –0.002 and significant (t-statistic=-2.87). This suggests that the level of compensation moderately decreases as top executives become older *after* the age of 65, indicating a non-linearity in the association between executive's age and his compensation. Finally, the coefficient on EDU is negative but not statistically significant.

6.2.2. Regression results: the level of top executive compensation

Model 2 in Table 4 includes the monitoring variables, LEV, KR and POUT, as well as the ownership variable, OWN, in addition to those included in Model 1. The coefficient on LEV is –1.09, which is significant at the 1 percent level (t-statistic=–5.15). This is consistent with Hypothesis 1, which predicts that firms with higher leverage are more effectively monitored by the main banks and, as a result, the level of compensation is lower. The coefficient on KR is negative (-0.02) but not statistically significant. This indicates either that the monitoring of a *keiretsu* firm by the main bank and other member firms is not effective or the effectiveness of *keiretsu* monitoring is mainly due to the main bank monitoring, which is indicated by the highly significant coefficient on LEV. The coefficient on PEROUT is positive but not statistically significant.

The coefficient on OWN is positive (0.06) and highly significant with the t-statistic of 6.24. This indicates that one-percent increase in the inside ownership increases the top executive compensation by 6.18 percent. This result is consistent with that top executive's power increases as he owns a higher percentage of the firm's shares, and as a result, he is more likely to pay himself a higher level of compensation.

6.2.3. Regression results: the sensitivity of top executive compensation to firm performance

Model 3 in Table 5 includes the interactions between the governance and ownership variables and the earnings-based performance measures, ROA, in

order to test the hypotheses regarding the effect of the governance on the sensitivity of pay to performance. The coefficient on ROA is positive (7.34) and significant at the 10 percent level (t-statistic=1.54), while that on RET is positive but not statistically significant. All of the coefficients on LNSALE, MB and BETA have the expected signs and are statistically significant. All of the human capital variables also are statistically significant.

The coefficient on LEV is negative (-0.89) and highly significant with the t-statistic of –3.66, and that on LEV*ROA is also negative (-15.49) and statistically significant with the t-statistic of –2.26. This result is consistent with Hypotheses 1 and 5b, which predicts the level of compensation is *lower* and the sensitivity of pay to firm performance is *lower*, as leverage increases. This suggests that highly leveraged firms effectively monitor the management and, therefore, they need to rely less on compensation contracts sensitive to firm performance to motivate managers. That is for highly leveraged firms the institutional monitoring to some extent substitutes for incentive contracts for top executives.

The coefficient on KR, -0.12, is significantly negative with the t-statistic of –3.30, but that on KR*ROA is significantly positive, 8.92, with the t-statistic of 4.47. This is consistent with Hypotheses 2 and 4b, which predict that the level of compensation is *lower*, and the sensitivity of pay to firm performance is *higher*, for *keiretsu* firms. This suggests that *keiretsu* firms are more strongly monitored by the main bank and other member firms, and, as a result, the level of top executive compensation is lower. It also suggests that *keiretsu* firms use compensation contract tied more strongly to firm performance to motivate and discipline the

managers. Thus, it can be argued that *keiretsu* firms use compensation contracts as complement to the institutional monitoring. It is interesting to note that LEV*ROA and KR*ROA have the opposite signs, which suggests that the banks use incentive contracts as a substitute for the institutional monitoring, while *keiretsu* use them as a complement. I conjecture the above may be caused by the fact that banks can more easily obtain information on managerial performance, including the level of efforts, so that top executive compensation of highly leveraged firms are less closely tied to such output-based performance measures as ROA. On the other hand, non-financial *keiretsu* firms cannot obtain such information on managerial performance as easily as banks, so that they try to tie top executive compensation more closely to firm performance measures to motivate and discipline managers.

The coefficient on PEROUT is negative (-0.003) but not significant (t-statistic=-1.10), although that on PEROUT*ROA is positive (0.29) and highly significant (t-statistic=3.69). This suggests that as a proportion of outside directors on the board increases, the sensitivity of executive compensation to firm performance increases. I conjecture this is caused by the fact that the outside directors effectively monitor the managers, and that outside directors can force the managers to accept more risky compensation plans.

OWN has a positive coefficient of 0.09 which is statistically significant (t-statistic=6.20), while that on its interaction with ROA is negative (-1.10) and significant (t-statistic=-3.77). This suggests that a top executive with a greater ownership of his firm has greater control over the board, and as a result, pays

himself higher level of compensation, which is also less dependent on firm performance.

6.2.4. Regression results: splitting the sample into *keiretsu* and non-*keiretsu* firms

In this section, I provide results of two separate regressions for *keiretsu* and non-*keiretsu* firms to examine whether the differences in firm characteristics between the two groups affect the results found previously. Also, this method allows me to examine three-way interactions between *keiretsu* affiliation, firm performance and other governance variables, i.e., leverage, the percentage of outside directors, and managerial ownership.

Table 6 shows the comparison of selected variables between *keiretsu* and non-*keiretsu* firms in order to illustrate the differences in characteristics between the two groups. The average log of compensation is higher for non-*keiretsu* firms, despite the fact that they are on average smaller than *keiretsu* firms, as indicated by the size proxy, LNSALE. This can be attributed to non-*keiretsu* firms' performing better than *keiretsu* firms in terms of ROA. Alternatively, the higher level of top executive compenatiotn for non-*keiretsu* firms can be a result of their having weaker governance mechanisms, on average, than non-*keiretsu* firms. I will investigate this issue in the multiple regression next.

Table 7 reports the results of two regressions. The first two columns are the results of regressions for *keiretsu* firms, and the last two are for non-*keiretsu*

firms. The coefficient on ROA for *keiretsu* firms is positive (19.77) and highly significant (t-statistic=2.70), while that for non-*keiretsu* firms is positive (2.85) but not significant (t-statistic=0.49). This suggests that *keiretsu* firms generally use compensation designs more sensitive to firm performance than do non-*keiretsu* firms. In fact, the coefficient indicates that for one percent increase in ROA, the level of compensation for *keiretsu* firms increases by 21.27 percent (exponential of 19.77 times 0.01 minus 1). Interestingly, the coefficient on RET for non-*keiretsu* firms is positive (0.19) and significant (t-statistic=2.12), while that for *keiretsu* firms is negative (-0.13) but only moderately significant (t-statistic=-1.65). The above results suggest that the choice of performance measures in the top executive compensation contracts differ between *keiretsu* and non-*keiretsu* firms. I conjecture that this may be a result of *keiretsu* firms being managed more toward the interests of their main banks, rather than those of other shareholders. That is, since the *keiretsu* main banks are mainly interested in protecting their loans, and, therefore, they try to tie compensation of top executives of the borrower firms to earnings-based measures, such as ROA, than stock price based ones.

The coefficient on LEV is significantly negative for both *keiretsu* and non-*keiretsu* firms. This suggests that as leverage increases, the bank monitoring becomes stronger and, as a result, the level of compensation becomes lower for both *keiretsu* and non-*keiretsu* firms. Nevertheless, the coefficient on LEV*ROA is significantly negative only for *keiretsu* firms (-21,31: t-statistic=-2.18), while that is not significant for non-*keiretsu* firms. This finding is counter to that found using the combined samples. However, I conjecture that banks help reduce the

managerial opportunism for both *keiretsu* and non-*keiretsu* firms, but for *keiretsu* firms their banks can obtain more information on managerial performance, including such factors as the level of efforts, and as a result, they rely less on output-based performance measures to motivate and discipline the managers.

The PEROUT in the *keiretsu* regression is negative (-0.01) and highly significant (t-statistic=-5.88) and the interaction between PEROUT and ROA is also negative (-0.11) but not significant (t-statistic=-1.00). This suggests that for *keiretsu* firms, the monitoring of management becomes more effective as the percentage of outside directors on the board becomes greater. For non-*keiretsu* firms, the coefficient on PEROUT is positive (0.003) but insignificant, while that on PEROUT*ROA (0.28) is positive and significant at the 1 percent level. This suggests that for non-*keiretsu* firms, as the percentage of outside directors on the board increases, their governance becomes more effective, and as a result, they can force the management to accept compensation more sensitive to firm performance. However, it is puzzling that the level of top executive compensation for non-*keiretsu* firms is not affected by the changes in the percentage of outside directors. At this point, I cannot offer any theory as to why only the sensitivity of pay to performance is affected.

Finally, the coefficient on OWN is positive and significant for both groups. The coefficient on OWN*ROA is *negative* (-0.86) and significant for non-*keiretsu* firms (t-statistic=-2.80), while it is *positive* (0.53) but not significant for *keiretsu* firms. This suggests that when non-*keiretsu* firm has higher inside ownership, their managers have greater power over the boards, increasing managerial

opportunism, which results in lower sensitivity of top executive compensation to performance. The result for *keiretsu* firms is not what was predicted. It indicates that when a *keiretsu* firm has a higher level of inside ownership, the sensitivity of top executive compensation to an earnings-based performance measure is higher. Barring the inside ownership proxying for some other variables missing in the model, the result suggests that a top executive of a *keiretsu* firm is willing to accept riskier compensation design even though his power increases through his higher percentage ownership.

6.3. Sensitivity test

6.3.1. Inclusion of dividends received in the compensation proxy

In order to control for the potentially confounding effect of including dividends in the compensation proxy, I adjust the proxy for the amounts of dividends received by top executives. I do this by subtracting from imputed compensation amounts a total amount of dividends received by *all* directors, which can be calculated by multiplying dividends per share by total number of shares held by all directors. The total number of shares held by all directors is calculated by multiplying the total number of shares outstanding by the percentage ownership by all directors (OWN).

Unfortunately, this method of adjustment for the amounts of dividends is not precise because I only have data on the percentage of shares owned by *all* directors, OWN, but not by individual executives. However, I argue that this

method provides an upper bound adjustment on the amounts of income by treating top executives as owning all shares held by directors. Nevertheless, I argue that the inside ownership percentages will be an adequate proxy for top executive power because it appears that when inside ownership is high, say more than 10 percent, it is usually the top executive and his family who own the highest portion of it.

Table 8 provides comparisons of COMP and ADCOMP, which is the compensation amount adjusted for the dividends received. As expected, the mean and median of ADCOMP are lower than those of COMP. The mean ADCOMP is ¥94,174, which is about 6.2 percent lower than the mean COMP, while the median ADCOMP is ¥59,359, which is about 1.2 percent lower than the median COMP.

The result of a regression using ADCOMP is given in Table 9. Although the explanatory power of the regressions is lower, the use of the compensation proxy adjusted for the dividends does not change the basic results found previously.

6.3.2. Use of the level of compensation and economic significance of each coefficient

In order to check the robustness of the model, I run the compensation regression using the raw compensation amounts as a dependent variable. This

model also allows me to make inferences on the economic significance of each coefficient.

I present the regression result in Table 10. The coefficient on ROA is 1,811,275, which is significant at the one percent level, suggesting that one percent increase in ROA increases the top executive compensation by approximately ¥18 million, or $180,000 using an exchange rate of ¥100/US$. In contrast, one-percent increase in RET increases the compensation by approximately ¥300,000. The coefficient on LNSALE is 27,745 and significant at the one percent level, and that on MB is 8,360,395 and significant at the one percent level. The coefficient on BETA is -11,421 but not statistically significant (t-statistic=-1.09). The coefficients on the human capital variables are all positive as expected and significant at the level of at least five percent.

The coefficient on LEV is negative (-99,085) and significant at the five percent level, and that on LEV*ROA is also negative (-3,965,118) and significant at the one percent level. This is similar to the result found for the previous specification. This result suggests that as a ratio of total debt to total assets increases by one percent, the level of top executive compensation decreases by approximately ¥990,000. The coefficient on KR is –19,406 (t-statistic=-3.83), while that on KR*ROA is 1,868,271 (t-statistic=4,74), a result consistent with the finding for the model using the logarithm of compensation. This suggests that for *keiretsu* firms the level of compensation is on average lower by approximately ¥19,000,000. This is highly significant given that the mean level of compensation for the sample is ¥100,358,000, i.e., top executives of *keiretsu* firms earn on

average 18.93 percent less than those of non-*keiretsu* firms, controlling for other factors.

The coefficient on PEROUT is negative (-89,549) but not significant, while that on PEROUT*ROA (32,041) is positive and significant at the one percent level. This is consistent with the result of the previous model, suggesting that as the percentage of outside directors increases, the monitoring becomes more effective, and that the effective monitoring by outside directors is complemented by the executive compensation more sensitive to firm performance.

OWN has a positive coefficient, 14,143, which is highly significant (t-statistic=4.95), while OWN*ROA has a negative and significant coefficient (-183,006: t-statistic=-3.44). Once again, this is consistent with the argument that as the inside ownership increases, the top executive power increases and, as a result, he pays himself a higher level of compensation. This result also suggests that the top executive who owns a higher proportion of his own firm's shares, he designs his own compensation to be less risky, i.e., less sensitive to firm performance.

6.3.3. Estimation of annual regressions: a potential effect of serial correlation in the dependent variable

Finally, I investigate the effect of serial correlation in the dependent variable. As indicated by Durbin-Watson statistics of almost all regressions, there exists high serial correlation in the regression errors. In order to control for this, I

run five annual cross-sectional regressions and examine the statistical significance of each of the coefficient. Ideally, I would like to run a Fama-Macbeth regression to obtain more consistent estimates of coefficients. However, the estimated coefficients will not be stable given my data only consist of five-year observations.

Table 11 shows the results of the five annual regressions. The heteroscedasticity consistent t-statistics are given underneath each coefficient. The coefficients on ROA, LNSALE, BETA and AGE seem to be statistically significant for each year and to carry the expected signs consistently. Among the governance variables, only OWN and ROA*OWN have consistently significant coefficients each year and their signs seem to support the CEO power hypotheses.

Chapter 7: Summary and Discussion

7.1. Summary and conclusions

This dissertation investigates the association between top executive compensation and the effectiveness of corporate governance mechanisms for Japanese firms. I examine leverage as a proxy for the strength of bank monitoring, and *keiretsu* affiliation as a proxy for *keiretsu* monitoring. I also examine the percentage of outside director as a proxy for the strength of monitoring by large shareholders and debtholders. Finally, I study the effect of the level of managerial ownership as a proxy for top executive control.

I find that the level of top executive compensation is lower and the sensitivity of compensation to firm performance, as measured by return-on-assets, is generally higher for *keiretsu* firms. This result suggests that *keiretsu* firms more effectively monitor their management and have the power to force riskier compensation on their managers. This is consistent with the incentive-complement hypothesis, which predicts that firms with stronger governance mechanisms use incentive contracts more sensitive to firm performacne to

motivate their managers. Alternatively, the above result suggests that for non-*keiretsu* firms, it is easier for their managers to entrench themselves and engage in opportunistic behaviors, and as a result, the managers design less risky compensation for themselves. Compensation is considered less risky when it is greater than an equilibrium level and less sensitive to firm performance.

I also find that as leverage increases, the level of top executive compensation decreases for both *keiretsu* and non-*keiretsu* firms. This suggests that as firms borrow more from the banks, the monitoring by the lenders (banks) becomes stronger and, as a result, the level of compensation decreases. In addition, I find that the sensitivity of top executive pay to firm performance decreases as leverage increases, although this finding is only true for *keiretsu* firms. This suggests that for *keiretsu* firms, firms with more bank borrowings tend to rely less on incentive contracts to motivate and discipline their managers. This is consistent with the incentive-substitute hypothesis, which predicts that firms with stronger governance mechanisms can more effectively monitor their managers, and, therefore, they rely less on incentive contracts to motivate and discipline their managers. I do not find any results on the sensitivity of pay to performance for non-*keiretsu* firms.

I find that the level of compensation is generally lower for all firms as the percentage of outside directors increases. This suggests that the monitoring becomes more effective through the presence of outside directors. However, when I split my sample into *keiretsu* and non-*keiretsu* firms, I find somewhat different results for each group. For *keiretsu* firms, the level of compensation

decreases, while the sensitivity of pay to performance is not affected, as the percentage of outside directors increases. On the other hand, for non-*keiretsu* firms, the sensitivity of pay to performance increases, while the level of compensation is not affected, as the percentage of outside directors increases. This suggests that for non-*keiretsu* firms, as the percentage of outside directors on the board increases, their governance becomes more effective, and, as a result, they can force riskier compensation on their managers. However, it is puzzling to see that the level of top executive compensation for non-*keiretsu* firms is not associated with the percentage of outside directors. At this point, I cannot offer any theory as to why only the sensitivity of pay to performance is affected. It appears that the roles of outside directors are different for *keiretsu* and non-*keiretsu* firms.

Finally, I find that the level of compensation increases as managerial ownership increases. This suggests that firms with a higher level of managerial ownership experience greater agency problems, and, *ceteris paribus*, they pay higher levels of compensation to their top executives. The sensitivity of pay to performance increases as managerial ownership increases for *keiretsu* firms, but decreases for non-*keiretsu* firms, suggesting that top executives of non-*keiretsu* firms are more likely to entrench themselves as they own a greater proportion of their firm's shares.

Overall, I find that the level of top executive compensation decreases as the corporate governance structures become stronger. I also find that the sensitivity of pay to performance is affected by the effectiveness of the

governance structures, although each governance mechanism seems to affect it differently. That is firms with certain mechanisms tend to use incentive contracts as a complement to other forms of corporate governance, while others tend to use them as a substitute.

7.2. Future work and discussions

There are a number of refinements needed to enhance the results found in this dissertation. First, I need data for a longer period of time in order to obtain more stable estimates of the coefficients. With data for longer-periods, I will be able to estimate coefficients using the Fama-Macbeth method.

Second, I could use more refined variables to capture the effect of the main bank monitoring. For example, I could use the percentage of borrowing from the main bank, instead of leverage, to better capture the effect. Also, I could separately examine the effectiveness of monitoring by bank directors and corporate directors, rather than lumping them both in the outside directors category. To obtain these data, I would have to refer to *Kigyo Keiretsu Soran*, published by Toyo Keizai Inc., which I only have one-year issue for 1992.

In addition, I can examine the association between the governance mechanisms and firm performance, as in Core et al. (1999). They first investigate the association between the level of CEO compensation and various governance structures. Subsequently, they examine whether the "excess" compensation are associated with firm performance to determine that the amounts paid to CEO in excess of that implied by the standard determinants indeed represent the agency problem. So, I can calculate the excess compensation for Japanese executives and run the regression of these amounts on firm performance. The difficulty is that if the firms are having agency problems, they should already be performing

poorly, so it would be difficult to determine which performance measures to uses in the above regression, e.g., how long the window should be, etc.

In the future, I can include more governance variables in the regression. For example, many firms have recently adopted the executive director system. *The Weekly Toyo Keizai* (9/19/1998) reports that as many as 30 firms have installed the executive directors system to improve the speed and efficiency of decision-makings. Basically, these firms have named a few highest ranked directors, including top executives, as executive directors and hold them responsible for setting the firms' strategies. I can obtain the data on this and include a dummy variable in the regression.

Also, due to the public pressure, many firms have started reducing the number of directors. For example, Sega Enterprises, Ltd. reduced the number of directors from 30 to 17 in 1998 (*The Weekly Toyo Keizai*, 9/19/1999). So, I can also investigate the effect of the reduction in the number of directors on the executive compensation and firm performance. I do have data on the number of directors for this dissertation but decide not to include it in the regressions because of its high correlation with firm size proxy (.78). However, I may be able to investigate the *changes* in the number of directors, instead of the level.

Finally, Tokyo Electron Ltd., a firm listed in Tokyo Stock Exchange, recently voluntarily announced the amounts of compensation paid to top four executives and the information on executive stock options (Nihon Keizai Shinbun 6/13/1999). According to the president, they decided to disclose such information to increase the accountability of the management, and to increase the sense of

responsibility for the executives. Thus far, this is the only firm that discloses such information, but I believe that this is the continuing trend in Japan. It would make this type of research more precise if these data become available.

In short, Japanese firms are going through major changes in terms of corporate governance in recent years. I believe it would be fruitful to study the effects of such structural changes on the level of compensation, as well as the executive-pay-to-performance relations, to better understand the corporate governance of Japanese firms. I hope the results of such research will shed more lights on the search of "ideal" governance structures.

Table 1

Descriptive statistics of all variables.

Variable	Num.of Obs.	Mean	Median	Std. Dev.	Min.	Max.
Compensation variables						
COMP	1156	100,358	60,025	130,103	27,884	1,514846
LNCOMP	1156	11.183	11.003	0.689	10.234	14.231
Firm performance variables						
ROA	1463	0.015	0.012	0.023	-0.230	0.168
RET	1435	0.007	-0.026	0.263	-0.647	1.447
Size variable						
LNSALE	1463	13.289	13.172	1.494	9.189	16.874
Growth Opportunity variable						
MB	1463	2.457	2.015	1.936	0.723	33.522
Risk variable						
BETA	1463	0.788	0.765	0.245	0.118	1.582
Human capital variables						
AGE	1439	66.033	66.000	6.557	44.000	89.000
TENURE	1450	5.387	3.400	6.966	0.000	46.880
DEDU	1461	0.824	1.000	0.381	0.000	1.000
Governance variables						
LEV	1463	0.654	0.655	0.195	0.104	0.975
KR	1813	0.538	1.000	0.499	0.000	1.000
OUT	1252	2.254	1.000	3.087	0.000	18.000
DOUT	1461	2.154	1.000	3.087	0.000	1.000
PEROUT	1252	8.298	3.846	12.008	0.000	84.211
BSIZE	1255	29.866	28.000	10.685	10.000	60.000
Ownership variable						
OWN	1255	2.172	0.100	5.085	0.010	32.600

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ROA: Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).

RET: Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.

LNSALE: Natural log of sales.

MB: Market-to-book ratio at the beginning of each year.

BETA: Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.

AGE: Age of top executive on December 31 of each year.

TENURE: Years in the current position as of July 31 of each year.

DEDU: Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.

LEV: Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).

KR:	*Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.
OUT:	Number of outside directors.
DOUT:	Outside director dummy, 1 if there is at least one outside director, 0 otherwise.
PEROUT:	Percentage of outside directors on the board.
BSIZE:	Number of directors on the board.
OWN:	Percentage of shares owned by all directors.

Table 2
Correlations among selected variables.

Variable	LNCOMP	ROA	RET	LNSALE	BETA	MB	AGE	TENURE	DEDU	LEV	KR	DOUT	PEROUT	BSIZE	OWN
LNCOMP	1.0000	0.3426	0.0402	0.0637	-0.2830	0.0006	-0.0582	0.2886	-0.0572	-0.2975	-0.1606	-0.0949	-0.0347	0.1674	0.3468
		(0.0001)	(0.2063)	(0.0449)	(0.0001)	(0.9854)	(0.0688)	(0.0001)	(0.0722)	(0.0001)	(0.0001)	(0.0028)	(0.2790)	(0.0001)	(0.0001)
ROA		1.0000	0.0882	-0.1589	-0.3195	0.0534	-0.0538	0.2410	-0.1548	-0.5126	-0.1160	-0.1163	-0.0201	-0.1642	0.2211
			(0.0008)	(0.0001)	(0.0001)	(0.0431)	(0.0410)	(0.4410)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.5103)	(0.0001)	(0.0001)
RET			1.0000	0.0111	-0.0866	-0.2521	0.0131	0.0205	-0.0168	-0.0756	-0.0254	0.0472	-0.0116	-0.0102	0.0475
				(0.6756)	(0.0010)	(0.0001)	(0.6232)	(0.4410)	(0.5348)	(0.0042)	(0.3364)	(0.0928)	(0.7030)	(0.7203)	(0.1262)
LNSALE				1.0000	-0.2360	-0.0357	0.0981	-0.2048	0.2092	0.5851	0.1389	-0.0690	-0.4205	0.7809	-0.2274
					(0.0001)	(0.1763)	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0139)	(0.0001)	(0.0001)	(0.0001)
BETA					1.0000	0.0473	0.0410	-0.0112	-0.0842	0.1792	0.0668	0.0679	0.1441	-0.1374	-0.0191
						(0.0732)	(0.1200)	(0.6701)	(0.0013)	(0.0001)	(0.0106)	(0.0094)	(0.0001)	(0.0001)	(0.5002)
MB						1.0000	0.0077	-0.0409	0.0219	0.2384	-0.0208	-0.0423	0.1094	0.0525	-0.0404
							(0.7709)	(0.1236)	(0.4189)	(0.0001)	(0.4317)	(0.1314)	(0.0003)	(0.0661)	(0.1931)
AGE							1.0000	0.0755	-0.1190	0.2021	0.0959	-0.0073	-0.0751	0.0995	-0.1723
								(0.0043)	(0.0001)	(0.0001)	(0.0003)	(0.7960)	(0.0143)	(0.0004)	(0.0001)
TENURE								1.0000	-0.2312	-0.2836	-0.2305	0.0427	0.1550	-0.2427	0.3157
									(0.0001)	(0.0001)	(0.0001)	(0.1294)	(0.0001)	(0.0001)	(0.0001)
DEDU									1.0000	0.2197	0.1245	-0.0507	-0.1101	0.2021	-0.4148
										(0.0001)	(0.0001)	(0.0710)	(0.0003)	(0.0001)	(0.0001)
LEV										1.0000	0.2487	0.0183	0.0104	0.4875	(0.3522)
											(0.0001)	(0.4841)	(0.7137)	(0.0001)	(0.0001)
KR											1.0000	0.0076	-0.0322	0.2217	-0.2373
												(0.7863)	(0.2914)	(0.0001)	(0.0001)
DOUT												1.0000	0.5539	-0.0663	0.0113
													(0.0001)	(0.0188)	(0.7097)
PEROUT													1.0000	-0.2532	0.1477
														(0.0001)	(0.0001)
BSIZE														1.0000	(0.2114)
															(0.0001)
OWN															1.0000

Variable definitions

COMP:	Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen): If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5 If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5
LNCOMP:	Natural log of COMP.
ROA:	Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).
RET:	Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.
LNSALE:	Natural log of sales.
MB:	Market-to-book ratio at the beginning of each year.
BETA:	Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.
AGE:	Age of top executive on December 31 of each year.
TENURE:	Years in the current position as of July 31 of each year.
DEDU:	Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.
LEV:	Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).
KR:	*Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.
DOUT:	Outside director dummy, 1 if there is at least one outside director, 0 otherwise.
PEROUT:	Percentage of outside directors on the board.
BSIZE:	Number of directors on the board.
OWN:	Percentage of shares owned by all directors.

Table 3

Regression of logarithm of top executive compensation on the standard determinants of pay (t-statistics are heteroscedasticity consistent).

Variable	Expected sign	Coefficient	t-stat.
Intercept		10.305 ***	29.999
Firm performance variables			
ROA	+	7.637 ***	6.154
RET	+	-0.000	-0.004
Size variable			
LNSALE	+	0.059 ***	5.236
Growth opportunity variable			
MB	+	0.025	1.484
Risk variable			
BETA	?	-0.540 ***	-6.686
Human capital variables			
AGE	+	0.005	1.202
AGEOLD	-	-0.002 ***	-2.871
TENURE	+	0.026 ***	8.311
DEDU	+	-0.080	-1.399
Num. of Obs.		981	
F-value		33.552	
Adjusted R^2		0.230	
Durbin-Watson D		1.285	

*** Significant at the 1 percent level.

Model 1: $LNCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + e$

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the Following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ROA: Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).

RET: Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.

LNSALE: Natural log of sales.

MB: Market-to-book ratio at the beginning of each year.

BETA: Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.

AGE:	**Age of top executive on December 31 of each year.**
AGEOLD:	**Dummy variable, 1 if AGE is greater than 65, 0 otherwise.**
TENURE:	**Years in the current position as of July 31 of each year.**
DEDU:	**Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.**

Table 4

Regression of logarithm of top executive compensation on the standard determinants of pay and the governance variables (t-statistics are heteroscedasticity consistent).

Variable	Expected sign	Coefficient	t-stat.
Intercept		8.605 ***	25.204
Firm performance variables			
ROA	+	1.985	1.551
RET	+	0.075	1.021
Size variable			
LNSALE	+	0.164 ***	9.224
Growth opportunity variable			
MB	+	0.068 ***	3.671
Risk variable			
BETA	?	-0.365 ***	-4.929
Human capital variables			
AGE	+	0.014 **	3.563
AGEOLD	-	-0.002 ***	-2.595
TENURE	+	0.017 ***	5.432
DEDU	+	0.142 ***	2.601
Governance variables			
LEV	-	-1.087 ***	-5.152
KR	-	-0.020	-0.570
PEROUT	-	0.002	1.032
Ownership variable			
OWN	+	0.059 ***	6.241
Num. of Obs.		981	
F-value		45.241	
Adjusted R^2		0.370	
Durbin-Watson D		1.332	

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Model 2: $LNCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + b_{10} LEV + b_{11} KR + b_{12} PEROUT + b_{12} OWN + e$

Variable definitions

COMP:	Cash compensation estimated from the actual income tax amount using the Following formula (in thousands yen): If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5 If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5
LNCOMP:	Natural log of COMP.
ROA:	Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).
RET:	Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.
LNSALE:	Natural log of sales.
MB:	Market-to-book ratio at the beginning of each year.
BETA:	Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.
AGE:	Age of top executive on December 31 of each year.
AGEOLD:	Dummy variable, 1 if AGE is greater than 65, 0 otherwise.
TENURE:	Years in the current position as of July 31 of each year.
DEDU:	Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.
LEV:	Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).
KR:	*Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.
PEROUT:	Percentage of outside directors on the board.
OWN:	Percentage of shares owned by all directors.

Table 5

Regression of logarithm of top executive compensation on the standard determinants of pay and the governance variables and their interactions with firm performance (t-statistics are heteroscedasticity consistent).

Variable	Expected sign	Coefficient	t-stat.
Intercept		8.538 ***	25.359
Firm performance variables			
ROA	+	7.336 **	1.540
RET	+	0.108	1.488
Size variable			
LNSALE	+	0.161 ***	9.148
Growth opportunity variable			
MB	+	0.065 ***	3.536
Risk variable			
BETA	?	-0.326 ***	-4.449
Human capital variables			
AGE	+	0.014 ***	3.514
AGEOLD	-	-0.002 ***	2.611
TENURE	+	0.015 ***	4.887
DEDU	+	0.127 ***	2.485
Governance variables			
LEV	-	-0.892 ***	-3.657
LEV*ROA	?	-15.490 **	-2.262
KR	-	-0.119 ***	-3.298
KR*ROA	?	8.916 ***	4.469
PEROUT	-	-0.003	-1.101
PEROUT*ROA	?	0.293 ***	3.693
Ownership variables			
OWN	+	0.094 ***	6.196
ROA*OWN	-	-1.100 ***	-3.769
Num. of Obs.		981	
F-value		40.896	
Adjusted R^2		.409	
Durbin-Watson D		1.400	

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Model 3: $LNCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + b_{10} LEV + b_{11} LEV*ROA + b_{12} KR + b_{13} KR*ROA + b_{14} PEROUT + b_{15} PEROUT*ROA + b_{16} OWN + b_{17} OWN*ROA + e$

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the Following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ROA: Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).

RET: Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.

LNSALE: Natural log of sales.

MB: Market-to-book ratio at the beginning of each year.

BETA: Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.

AGE: Age of top executive on December 31 of each year.

AGEOLD: Dummy variable, 1 if AGE is greater than 65, 0 otherwise.

TENURE: Years in the current position as of July 31 of each year.

DEDU: Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.

LEV: Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).

KR: *Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.

PEROUT: Percentage of outside directors on the board.

OWN: Percentage of shares owned by all directors.

Table 6

Comparison of variables between *keiretsu* and non-*keiretsu* firms

	Non-*keiretsu* Firms (n = 541)				*Keiretsu* Firms (n = 420)					
Variable	Mean	S.D.	Min.	Max.	Mean	S.D.	Min.	Max.	T	Prob > |T|
Compensation variable										
LNCOMP	11.247	0.657	10.236	13.306	11.043	0.578	10.269	13.300	5.2051	0.0001
Firm characteristics variables										
ROA	0.018	0.022	-0.085	0.083	0.012	0.017	-0.107	0.070	4.8461	0.0001
RET	0.006	0.261	-0.647	0.772	-0.010	0.215	-0.613	0.603	1.1708	0.2419
LNSALE	13.120	1.478	9.736	16.707	13.588	1.304	10.568	16.746	-5.9962	0.0001
MB	2.323	1.347	0.902	8.907	2.359	1.030	0.897	8.271	-0.5495	0.5828
BETA	0.764	0.232	0.301	1.455	0.801	0.241	0.251	1.582	-2.7783	0.0056
Human capital variables										
AGE	65.167	6.831	44.000	81.000	66.706	5.865	45.000	81.000	-4.3677	0.0001
TENURE	6.398	7.583	0.000	46.000	3.486	3.730	0.000	27.000	8.8971	0.0001
DEDU	0.827	0.379	0.000	1.000	0.855	0.352	0.000	1.000	-1.3706	0.1708
Governance variables										
LEV	0.606	0.189	0.118	0.958	0.706	0.167	0.177	0.957	-10.0106	0.0001
DOUT	0.542	0.499	0.000	1.000	0.549	0.498	0.000	1.000	-0.2712	0.7863
PEROUT	6.741	8.863	0.000	45.833	6.175	8.632	0.000	41.379	1.0580	0.2902
Ownership variable										
OWN	2.486	4.584	0.100	32.300	0.727	1.790	0.010	9.700	8.5867	0.0001

Variable definitions

COMP:	**Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen):** **If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5** **If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5**
LNCOMP:	**Natural log of COMP.**
ROA:	**Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).**
RET:	**Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.**
LNSALE:	**Natural log of sales.**
MB:	**Market-to-book ratio at the beginning of each year.**
BETA:	**Beta calculated using an equally-weighted market index from all Japanese firms included in Global**
AGE:	**Vantage.**
TENURE:	**Age of top executive as of December 31 of each year.**
DEDU:	**Years in the current position as of July 31 of each year.**
LEV:	**Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.**
KR:	**Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).**
DOUT:	***Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.**
PEROUT:	**Outside director dummy, 1 if there is at least one outside director, 0 otherwise.**
OWN:	**Percentage of outside directors on the board.** **Percentage of shares owned by all directors.**

Table 7

Regressions of logarithm of top executive compensation on the standard determinants of pay and the governance variables and their interactions with firm performance. Separate regressions are estimated for *keiretsu* and non-*keiretsu* samples (t-statistics are heteroscedasticity consistent).

		***Keiretsu* firms**		**Non-*keiretsu* firms**	
Variable	Exp. sign	Coefficient	t-stat.	Coefficient	t-stat.
Intercept		9.308 ***	25.211	8.575 ***	17.327
Firm performance variables					
ROA	+	19.770 ***	2.697	2.850	0.486
RET	+	-0.132 *	-1.649	0.190 **	2.015
Size variable					
LNSALE	+	0.090 ***	4.606	0.151 ***	6.125
Growth opportunity variable					
MB	+	0.063 ***	3.289	0.044 *	1.832
Risk variable					
BETA	?	-0.221 ***	-2.891	-0.500 ***	-3.777
Human capital variables					
AGE	+	0.012 **	2.539	0.014 *	2.564
AGEOLD	-	-0.001	1.444	-0.002 *	1.826
TENURE	+	0.003	0.541	0.020 ***	5.625
DEDU	+	-0.004	-0.083	0.234 ***	3.364
Governance variables					
LEV	-	-0.539 **	-2.345	-0.719 ***	-2.212
LEV*ROA	?	-21.314 **	-2.182	-5.384	-0.631
PEROUT	-	-0.012 ***	-5.883	0.003	0.765
PEROUT*ROA	?	-0.106	-0.996	0.277 ***	2.912
Ownership variables					
OWN	+	0.145 ***	7.771	0.080 ***	4.602
ROA*OWN	-	0.530	0.709	-0.875 ***	-2.803
Num. Of Obs.		428		552	
F-value		59.288		20.163	
Adjusted R^2		0.671		0.342	
Durbin-Watson D		1.424		1.479	

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Model 3: $LNCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + b_{10} LEV + b_{11} LEV*ROA + b_{12} KR + b_{13} KR*ROA + b_{14} PEROUT + b_{15} PEROUT*ROA + b_{16} OWN + b_{17} OWN*ROA + e$

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ROA: Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).

RET: Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.

LNSALE: Natural log of sales.

MB: Market-to-book ratio at the beginning of each year.

BETA: Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.

AGE: Age of top executive as of December 31 of each year.

AGEOLD: Dummy variable, 1 if AGE is greater than 65, 0 otherwise.

TENURE: Years in the current position as of July 31 of each year.

DEDU: Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.

LEV: Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).

KR: *Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.

PEROUT: Percentage of outside directors on the board.

OWN: Percentage of shares owned by all directors.

Table 8

Descriptive statistics of top executive compensation and top executive compensation adjusted for the amounts of dividends received by all directors.

Variable	Num. of Obs.	Mean	Median	Std. Dev.	Min.	Max.
Compensation variables						
COMP	1156	100,358	60,025	130,103	27,884	1,514,846
ADCOMP	1026	94,174	59,359	118,239	-92,241	1,359,009
LNCOMP	1156	11.183	11.003	0.689	10.236	14.231
LADCOMP	1018	11.152	10.995	0.701	6.464	14.122

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ADCOMP: COMP minus the amounts of dividends received by all directors each year. The amount of dividends is obtained by multiplying a dividend per share by the total number of shares owned by all directors.

LADCOMP: Natural log of ADCOMP.

Table 9

Regression of logarithm of top executive compensation on the standard determinants of pay and the governance variables and their interactions with firm performance. The compensation amounts are adjusted for the amounts of dividends received by all directors (t-statistics are heteroscedasticity consistent).

Variable	Expected sign	Coefficient	t-stat.
Intercept		7.845 ***	17.684
Firm performance variables			
ROA	+	9.568	1.412
RET	+	0.016	0.189
Size variable			
LNSALE	+	0.196 ***	7.387
Growth opportunity variable			
MB	+	0.055 **	2.339
Risk variable			
BETA	?	-0.241 ***	-3.270
Human capital variables			
AGE	+	0.016 ***	3.547
AGEOLD	-	-0.111 **	-2.211
TENURE	+	0.013 ***	4.400
DEDU	+	0.200 ***	3.429
Governance variables			
LEV	-	-0.688 ***	-2.331
LEV*ROA	?	-27.278 **	-2.712
KR	-	-0.226 ***	-4.709
KR*ROA	?	13.780 ***	6.543
PEROUT	-	-0.007 **	-2.412
PEROUT*ROA	?	0.448 ***	4.106
Ownership variables			
OWN	+	0.078 ***	4.00
ROA*OWN	-	-0.994 ***	-2.631
Num. of Obs..		693	
F-value		29.052	
Adjusted R^2		0.408	
Durbin-Watson D		1.427	

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Model 4: $LADCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + b_{10} LEV + b_{11} LEV*ROA + b_{12} KR + b_{13} KR*ROA + b_{14} PEROUT + b_{15} PEROUT*ROA + b_{16} OWN + b_{17} OWN*ROA + e$

Variable definitions

COMP: Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen):
If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5
If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5

LNCOMP: Natural log of COMP.

ADCOMP: COMP minus the amounts of dividends received by all directors each year. The amount of dividends is obtained
by multiplying a dividend per share by the total number of shares onwed by all directors.

LADCOMP: Natural log of ADCOMP.

ROA: Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).

RET: Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.

LNSALE: Natural log of sales.

MB: Market-to-book ratio at the beginning of each year.

BETA: Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.

AGE: Age of top executive as of December 31 of each year.

AGEOLD: Dummy variable, 1 if AGE is greater than 65, 0 otherwise.

TENURE: Years in the current position as of July 31 of each year.

DEDU: Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.

LEV: Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).

KR: *Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.

PEROUT: Percentage of outside directors on the board.

OWN: Percentage of shares owned by all directors.

Table 10

Regression of top executive compensation on the standard determinants of pay and the governance variables and their interactions with firm performance.

Variable	Expected sign	Coefficient	t-stat.
Intercept		-291,033 ***	-5.503
Firm performance variables			
ROA	+	1,811,275 ***	2.436
RET	+	30,050 ***	2.550
Size variable			
LNSALE	+	21,745	6.869
Growth opportunity variable			
MB	+	8,360.395 ***	3.175
Risk variable			
BETA	?	-11,421	-1.094
Human capital variables			
AGE	+	1,649.957 ***	2.654
AGEOLD	-	-200.696 **	-2.041
TENURE	+	1,328.978 ***	2.447
DEDU	+	24,294 ***	2.801
Governance variables			
LEV	-	-99,085 **	-2.363
LEV*ROA	?	-3,965,118 ***	-3.412
KR	-	-19,406 ***	-3.833
KR*ROA	?	1,868,271 ***	4.740
PEROUT	-	-89.549	-0.248
PEROUT*ROA	?	32,041 ***	2.636
Ownership variables			
OWN	+	14,143 ***	4.951
ROA*OWN	-	-183,006 ***	-3.444
Num. of Obs.		981	
F-value		28.031	
Adjusted R^2		0.319	
Durbin-Watson D		1.221	

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Model 5: $COMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 TENURE + b_8 DEDU + b_9 LEV + b_{10} LEV*ROA\ b_{11} + KR + b_{12} KR*ROA + b_{13} PEROUT + b_{14} PEROUT*ROA + b_{15} OWN + b_{16} OWN*ROA + e$

Variable definitions

COMP:	Cash compensation estimated from the actual income tax amount using the following formula (in thousands yen): If year is 92, 93 or 94, then COMP = (Tax + 3,900) / 0.5 If year is 95 or 96, then COMP = (Tax + 6,600) / 0.5
ROA:	Return on assets calculated as (Net Income$_t$)/(Total Assets$_{t-1}$).
RET:	Annual stock return calculated as (Stock Price$_t$ + Dividend Per Share$_t$)/(Stock Price$_{t-1}$)-1, adjusted for stock splits and stock dividends.
LNSALE:	Natural log of sales.
MB:	Market-to-book ratio at the beginning of each year.
BETA:	Beta calculated using an equally-weighted market index from all Japanese firms included in Global Vantage.
AGE:	Age of top executive as of December 31 of each year.
AGEOLD:	Dummy variable, 1 if AGE is greater than 65, 0 otherwise.
TENURE:	Years in the current position as of July 31 of each year.
DEDU:	Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.
LEV:	Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).
KR:	*Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.
PEROUT:	Percentage of outside directors on the board.
OWN:	Percentage of shares owned by all directors.

Table 11

Annual regressions of logarithm of top executive compensation on the standard determinants of pay and the governance variables and their interactions with firm performance (t-statistics are heteroscedasticity consistent).

Variable	Exp. sign	92	93	94	95	96
Intercept		9.072	7.636	8.744	8.504	8.166
		(11.300)	(9.868)	(11.298)	(11.699)	(13.038)
Firm performance variables						
ROA	+	-14.396	19.008	18.539	16.240	11.828
		(-2.118)	(2.478)	(2.070)	(1.943)	(1.311)
RET	+	0.639	-0.257	0.368	-0.000	0.563
		(2.171)	(-1.163)	(1.718)	(-1.294)	(2.602)
Size variable						
LNSALE	+	0.218	0.193	0.163	0.112	0.125
		(5.549)	(4.841)	(3.748)	(3.721)	(3.653)
Growth opportunity variable						
MB	+	0.120	0.073	0.094	0.044	0.033
		(3.023)	(1.963)	(2.381)	(0.980)	(1.402)
Risk variable						
BETA	?	-0.123	-0.349	-0.416	-0.315	-0.254
		(-0.784)	(-2.042)	(-2.556)	(-2.313)	(-1.798)
Human capital variables						
AGE	+	0.007	0.019	0.010	0.014	0.017
		(0.774)	(2.371)	(1.250)	(1.557)	(2.091)
AGEOLD	-	-0.002	-0.003	-0.001	-0.000	-0.002
		(-.539)	(-2.166)	(-0.642)	(-0.394)	(-1.431)
TENURE	+	0.018	0.013	0.007	0.017	0.011
		(2.848)	(1.882)	(1.059)	(2.614)	(2.089)
DEDU	+	0.033	0.218	0.096	0.206	0.140
		(0.319)	(1.853)	(0.838)	(1.966)	(1.267)
Governance variables						
LEV	-	-2.283	-0.759	-0.999	0.026	-0.366
		(-5.428)	(-1.803)	(-2.120)	(0.067)	(-0.750)
LEV*ROA	?	25.454	-30.976	-24.442	-39.669	-8.623
		(1.744)	(-2.497)	(-1.889)	(-3.235)	(-0.730)
KR	-	-0.025	-0.079	-0.033	-0.219	-0.002
		(0.223)	(-1.053)	(-0.439)	(3.581)	(-0.026)
KR*ROA	?	8.437	7.181	2.549	17.771	-0.806
		(1.314)	(1.085)	(0.737)	(5.501)	(-0.188)
PEROUT	-	0.007	-0.000	-0.004	-0.008	-0.010
		(1.254)	(-0.092)	(-0.774)	(-2.223)	(-1.795)
PEROUT*ROA	?	-0.322	0.396	0.176	0.420	0.623
		(-1.153)	(2.442)	(0.898)	(3.131)	(3.303)

Ownership variables						
OWN	+	0.036	0.116	0.088	0.160	0.207
		(2.426)	(3.928)	(3.532)	(6.376)	(7.379)
ROA*OWN	-	0.046	-1.725	-1.230	-1.648	-4.389
		(0.136)	(-2.448)	(-2.899)	(-1.721)	(-4.257)
Num. of Obs.		200	193	199	196	190
F-value		8.760	11.312	8.676	13.348	13.320
Adjusted R^2		0.398	0.477	0.396	0.517	0.524
Durbin-Watson D		1.235	1.487	1.553	1.458	1.629

Model 3: $LNCOMP = b_0 + b_1 ROA + b_2 RET + b_3 LNSALE + b_4 MB + b_5 BETA + b_6 AGE + b_7 AGEOLD + b_8 TENURE + b_9 DEDU + b_{10} LEV + b_{11} LEV*ROA + b_{12} KR + b_{13} KR*ROA + b_{14} PEROUT + b_{15} PEROUT*ROA + b_{16} OWN + b_{17} OWN*ROA + e$

Variable definitions

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TENURE: Years in the current position as of July 31 of each year.

DEDU: Education dummy, 1 if he has a bachelor's degree or higher, 0 otherwise.

LEV: Leverage calculated as (Total Liability$_t$)/(Total Assets$_t$).

KR: *Keiretsu* dummy, 1 if a firm belongs to one of the eight corporate groups, 0 otherwise.

PEROUT: Percentage of outside directors on the board.

OWN: Percentage of shares owned by all directors.

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