

Employment System and Stock Options in Japan

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Abstract

This research aims to analyze the transitions in the traditional employment system and the use of new contracting technologies such as stock options in Japanese companies. The traditional lifetime employment (LTE) and seniority-based compensation systems that characterized the once superior performance of Japanese companies came under pressure after the burst of the economic bubble in Japan. A large number of long-tenured, highly paid employees can become a financial burden to a company because of these systems. Though companies have been reluctant to change this traditional structure, an adverse economic environment makes it difficult for the system to fulfill its functional prerequisites. The analysis confirms that a presence of LTE during an economic slowdown can have a negative effect on corporate profitability. Due to the disparity of traditional employment systems with the changes in business environment, there is a growing realization that there needs to be a change to a performance based compensation system.

In this regard, amendments in the commercial code of Japan, in 1997 provide an opportunity for the companies to use stock options as a performance based compensation for employees and executives. Option grants can serve as an alternative way to attract and retain quality personnel in the absence of an LTE system. With the decreasing role of main banks, the use of stock options can also provide the needed capital market orientation and commitment to the investors and shareholders. This study analyzes these economic justifications of option grants in Japan, on the basis of three different theories i.e., agency theory, the retention and sorting model, and the financial and ownership structure of a firm. It makes a variety of hypotheses regarding the possible benefits of

option grants and explains the implications of each in the Japanese business environment. While, agency theory fairly succeeds in defining the executive stock options, the employee stock options are most consistent with the explanation of retention and sorting motives. The findings of this study are able to redefine the role of risk and cash flow constraints with reference to the use of stock options for sorting and attraction of potential employees.

Though, Japanese companies are increasingly adopting the option-based compensation schemes, there are contrary views in the previous literature about the performance consequences of option plans. In order to address these controversies and conclude the study, this paper investigates the net economic value addition to the firm with the use of stock options in the Japanese business environment. Results indicate improvements, both in the operating performance and stock market returns after the announcement of stock option plans. Japanese evidence does not comply with the view that managers misuse options to enrich themselves at the cost of the firm's intrinsic value. The legacy of a traditional sense of ownership, in-groups and peer pressure in the Japanese management philosophy may have a role in eliminating such manipulations. The analysis also indicates the role of executive ownership and bonuses that increase the firm's performance. Finally, the study analyzes the systematic association between the intensity of option grants and hypothesized economic determinants for the positive abnormal returns. Overall, findings of the study are able to explain how stock options are helping Japanese companies to change the employment system without losing the potential benefits of traditional practices.

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Chapter-one

Introduction

1.1. Introduction

This doctoral dissertation is written according to the requirements of the Doctoral Program in Quantitative Finance and Management at the Graduate School of Systems and Information Engineering, University of Tsukuba. This research addresses the issue of transitions in Japanese employment practices; from the lifetime employment system to the use of stock options. This chapter presents the introduction of this research. Section two describes the focus and objectives of the research. Section three explains the motivations and implications of this field of research. Section four discusses the contributions of research and section five explains the arrangement of thesis.

1.2. Focus and objectives of research

Traditional corporate governance structure and employment systems were the two major areas affected after the burst of the economic bubble, in 1990. Both of these are interrelated to the parts of the traditional business model in Japan. With the advent of new challenges in the economic environment, there are drastic changes coming in both of these areas. This research focuses on the restructurings of the compensation systems after the burst of the economic bubble, and the consequences of these changes on the corporate profitability. During the post-bubble period, firms in Japan have been undergoing the transitions in employment practices and trying to adopt new contracting technologies, such as, stock options to cope with the requirements of a dynamic environment. The objectives of this research are two fold. First, it tries to analyze the benefits and costs associated with the traditional employment system and the functional prerequisites necessary to run this system effectively. This analysis explains the circumstances in

which it becomes difficult for the companies to fulfill these functional prerequisites and the traditional system starts to negatively affect the firm's performance. These findings provide a basis for the second objective of this research that is to analyze how new contracting technologies are evolving to create opportunities for better firm performance out of these challenges in the business environment. This includes the analyses of motives and determinants of using stock options and the performance impacts of such compensation schemes in the Japanese companies. These objectives are discussed in detail as follows.

It was difficult to continue the traditional lifetime employment (LTE) system after the burst of the bubble economy, which pushed the companies to replace the seniority-based compensation system with the performance-based system. However, under the LTE policy, companies in Japan had been investing heavily in the specific human capital in the form of education, training, and development of the firm-specific skills of the employees. Aside from the cost burdens of LTE, the major benefits of the system arise from the firm-specific skill formation and retention of key employees in the company. With the transitions in the traditional LTE structure, there was a gap for a mechanism to save the companies' investments in specific human capital. In addition, while the close relationships with the employees under the traditional system had helped Japanese firms to expand during the periods of high growth, they tended to discourage interactions with the 'outsiders' (shareholders and investors), which can decrease the economic efficiency in a time of slow growth. With the decreasing role of main banks, companies need to access the capital market, which means a higher stock price, is essential. In this regard, the use of stock options has got considerable attention after the

amendments to the commercial code of Japan, in 1997. Option grants can help to provide a performance-based compensation system with a capital market orientation and commitment to the shareholders. It is also helpful to create a mechanism to retain the valuable employees with the help of a vested exercise period. The ownership structure and preferences of the owners can also define the decision to go for option-based compensation. We construct our analysis around these requirements and expectation of using stock options and identify the implications of each with reference to the Japanese business environment. This analysis can help to explain the motives and determinants of using stock options in the Japanese companies as an effort to shift from the traditional relationship-oriented styles of management towards a performance- and market-oriented approach.

Despite the increasing use of stock options in Japanese companies, there is a lot of uncertainty about the performance consequences of these compensation schemes. The previous work on this issue has produced contentious results. In addition, most of the previous studies analyze the sample of US companies that may not provide adequate implications for the unique institutional characteristics¹ of the Japanese business environment. It is therefore, important to see whether stock options are really working in Japan or the results of stock options are overestimated. We address these issues by using multiple measures of firm performance to analyze the net expected value addition to the firm after the use of stock options. A related issue is to investigate any systematic

¹ The traditional Japanese business model has been different from US. Though Japanese corporate structure is in a state of flux, the legacy of cross-shareholdings, main banks and group of companies in the external environment and LTE approach in the employment practices makes the requirements and expectations of Japanese companies different from US companies.

association between economic determinants and the use of option-based compensation for performance gains. We conclude the analyses by analyzing the performance gains from option grants with reference the determinants and motivations of using option-based compensation.

1.3. Motivation and implications

The motivation for this research is primarily derived from the transitions in the traditional Japanese employment system. During the past several decades, this system was universally admired on the belief that it allowed companies to create long-term value with a focus on the ‘insiders’ (management and employees) rather than the pressures of quarterly earnings expectations of ‘outsiders’ (shareholders and market analysts). So long as Japan’s economic growth continued over a long period of time, this management style worked well and effectively met the needs and interests of all parties concerned. It produced stable corporate profits and gave employees a strong sense of attachment to their company, resulting in a powerful level of international competitiveness. But changes in the economic environment made the 1990s different. With little advance warning, the Japanese corporate environment drastically changed and as a result, the management style for Japanese corporations, once its strength, worked against them. Thus, it is important to analyze what factors caused this system to collapse and how it affected the corporate profitability. The findings of this analysis can play an important role to avoid such unpleasant surprises in the future.

A related issue is how the companies are responding to these changes. In this regard a major development is the use of stock options that started after the amendments

to the commercial code of Japan in 1997. After these amendments, Japanese companies have been increasingly adopting these compensation schemes both for executives and for employees. An examination of the determinants and motives of stock option based compensation may provide insights about how companies are responding to the changes in the business environment and what the needs and requirements of the companies are after the collapse of the traditional system. In addition, the analyses of performance consequences of stock options may help to predict the shape of future compensation schemes in Japan. While the above explanations are a short description of the motives and implications of this research, we discuss the details of these issues more in-depth in the following.

The Japanese employment relations and compensation systems had been characterized with the traditional business model that once rested on three main pillars of 'lifetime employment' (LTE), 'cross-shareholdings', and 'the role of main bank'. Traditionally in Japan, emphasis has been placed on the coexistence of these competing interests and mutual prosperity over a long span of time. Profits came second to the precedence given to the maintenance and expansion of business relationships and stable employment. However, after the burst of the economic bubble, the traditional systems began to constrain its ability to expand. Today, there is a growing realization that more dynamic mechanisms are required to provide Japanese firms with the competitiveness, labor mobility, access to venture and equity capital, and a more balanced approach between the interests of 'insiders' and 'outsiders'. A slow down in the economy and decreasing role of the main banks require Japanese firms to consider the need of

modifications to the traditional business model in order to remain competitive in the international market.

In an effort to shift from a traditional relationship-oriented style of management towards a market and performance oriented style, Japanese companies are naturally, concerned about losing the benefits of the traditional system and performance consequences of new contracting technologies. While the changes in the business environment imply an adoption of a performance-based employment system, a balanced approach to serve the interests of both the employees and shareholders is also necessary to support the overall changes in the corporate governance structure. In this regard, the use of stock options presents an opportunity for the companies to move towards a performance-based compensation system with a capital market orientation and a commitment to the stakeholders. The determinants of using option-based compensation are discussed in the previous literature with reference to the needs of aligning the interests of management with the shareholders (e.g., Jensen and Meckling, 1976; Demsetz and Lehn, 1985; Jensen, 1993). The use of stock options for retention and sorting potential employees is also documented in some recent studies (e.g., Lazear, 2004). The use of stock options is also explainable with reference to the ownership and capital structure of firms (Lewellen et al., 1987; Clinch, 1991; Beatty and Zajac, 1994; Anderson et al., 2000). In Japanese companies however, it is important to analyze how the changes in the unique institutional characteristics of Japanese business play a role to determine the use of stock options.

With reference to the changes in the corporate governance structure of Japanese companies, the introduction of a performance-based compensation system such as stock

options can be the first step in shifting from a traditional business model towards one that is more market-oriented. This may also help to make the top management of Japanese companies to take more notice of the stock prices to accelerate the move of re-gaining profitability and competitiveness. Stock options can also provide the necessary commitment to the owners and shareholders by aligning their interests with the management. Similarly, it can help to establish an important mechanism that will insure investors and shareholders that they will recover the money they invested. Traditionally, Japanese companies developed employees' loyalty by investing heavily in employees' firm-specific skill development and LTE contracts. The potential benefits of retention and sorting of talented employees through option grants can provide an opportunity for the companies to transform the employment system without losing their specific human capital.

We address these issues by analyzing the motives of the decision to go for option-based compensation in the Japanese companies. Additionally, it is often hypothesized that the pay-performance sensitivity in Japan is less sensitive in terms of stock-market performance (Kato et al., 2005). The increasing role of stock options in Japan is an indication that the importance of making executive benefit and shareholder benefit, coincide through stock based compensation, is gaining greater recognition. This may help to increase the pay-performance sensitivity of management in terms of stock-market returns. In order to complete the analyses, we address the issue of net expected value addition to the firm with the use of stock options. In this regard, the analyses of the relationship between the motives and outcomes of stock options may help to predict the shape of future employment contracts in Japan.

Overall, the findings of the research are able to explain the motivations and expectations of Japanese companies to transform the traditional employment practices. The findings are also helpful in understanding how stock options are helping the Japanese companies to move from the traditional relationship-oriented style of management towards one that is more performance- and market-oriented.

1.4. Contributions of research

While addressing the transformations in the Japanese employment practices, this research adds new insights in the compensation literature in several ways. Though there is a lot of speculation in the literature about the end of the traditional employment system in Japan (e.g., Horie, 1993; Suzuki, 1996; Smith, 1997; Dirk et al., 2000; Kato, 2001), but there is a lack of data and lack of a systematic explanation of why this happened. What are the main factors involved and how do these factors make it impossible for the companies to continue the traditional system? We try to answer these questions by identifying how the historical, demographic and economic factors created a mismatch with the long presence of the LTE system. This disparity increased the direct and indirect negative effects on the firm and made it difficult for the companies to continue the traditional system. The findings have implications for Japanese companies, to consider these factors in order to avoid unpleasant surprises in the future. This analysis establishes a basis of further research about the adoption of performance-based compensation systems in the face of restructuring in the traditional corporate governance system.

The increasing use of stock options in Japan presents another challenge to the researchers and economists interested in the Japanese employment relations. However,

there are only few studies dealing with the economic significance of the stock options in Japan². This research analyzes the use of stock options with reference to the transformations of traditional employment structures in Japan. In this way, it is an addition to the discussion of stock option based compensation from a Japanese perspective. Most of the previous literature uses the agency theory to explain stock options as a tool to mitigate the agency conflict between the owners and the management (e.g., Milgrom and Robert, 1992; Baker and Hall, 1998; Himmelberg et al., 1999; Lamont and Polk, 2001). While agency theory can define the use of stock options for the top executives, it may not fully explain employee stock options due to the limited ability of employees to affect the decision making process in the firm. In this regard, this research explores the issue, which is largely ignored in the research literature concerning why firms use stock options for employees.

We analyze three different theories to define the use of stock options for employees and executives in the Japanese companies. These include, agency theory, the retention and sorting model, and the financial and ownership structure of a firm. Though these theories are not mutually exclusive, the analysis defines the difference in the implications of these theories with reference to the Japanese business environment. The findings suggest that the use of executive stock options is consistent with the agency theory while employee stock options are most consistent with the retention and sorting model.

Another controversy addressed in this research is the opposing views about the role of risk and cash flow constraints to define the use of stock options. Though a higher

² Exceptions include Nagaoka (2001), Uchida (2005) and Kato et al. (2005).

risk may increase the value of options, the inability of managers and employees to hedge this risk can reduce the incentive level of stock-based compensation (Aggarwal and Samwick, 1999; Jin, 2002). Similarly, previous literature cannot fully explain the use of stock options as a substitute to cash payment. According to one point of view, the use of stock options can help to overcome cash flow constraints (Lewellen et al., 1987; Clinch, 1991; Core and Guay, 1999, 2001; Anderson et al., 2000). According to other points of view, the use of stock options as a substitute to cash payment may not be an optimal choice, because employees and managers may value the options less than the market value and the company has to bear the difference in the valuation as a deadweight loss of the stock option based compensation (Lambert et al., 1991; Carpenter, 1998; Muelbroek, 2001).

This research addresses these controversies with the help of the retention and sorting model. The risk associated with the stock options can help to attract less risk-averse employees or the employees having required abilities and skills to increase the value of a firm.

Similarly, the use of stock options as a substitute to cash is only helpful when the company is able to attract optimistic employees to work at the firm. These employees may value the options greater than the market value and the company can get a compensation discount on the wage payments. Overall findings of this analysis are helpful in providing comprehensive analyses of motives and determinants of stock options in the Japanese companies with reference to a variety of implications associated with this type of compensation schemes.

Finally, the previous literature about the performance consequences of stock

options has generated not only useful insights, but also has produced many contradictory findings. There are opposing views prevailing about the fundamental question of whether the option grants can really add value to a firm. Supporters of stock options advocate the use of option grants for better performance (Jensen and Meckling, 1976; Milgrom and Robert, 1992; Mehran, 1995; Himmelberg et al., 1999; Core and Guay, 1999; Kedia and Mozumdar, 2002). The critics of stock options point towards the hidden costs of granting options and the possibility of manipulating the accounting records and the time and release of information to increase the wealth of executives at the cost of the firm's intrinsic value (Yermack, 1995; Aboody and Kasznik, 2000; Carpenter and Remmers, 2001; Jenter, 2001; Meulbroek, 2001; Bens et al., 2002; Hall and Murphy, 2002). We consider both of these contrary views to analyze the use of stock options in Japan. The findings of this analysis can provide important implications about the effect of stock options on the firm's performance in the unique institutional characteristics of the Japanese business environment. This analysis is different from the previous studies in several ways. Unlike previous studies (e.g., Lambert and Larcker, 1987; Aboody, 1996; Rees and Stott, 1998; Core and Guey, 2001), we use multiple measures of the firm's performance to investigate how firm value changes after the announcement of option plans. Initially, the operating-performance measures are utilized but finally the abnormal returns of the firm are used to examine the net economic value addition to the firm.

The use of abnormal returns as the performance measure helps to analyze the reactions of investors and shareholders in response to the option grants. A positive market reaction may show the investor's confidence for the use of stock options as an efficient way of increasing the firm's value.

Among the previous studies, Aboody et al. (2002) and Core and Guey (1999) find some results of better performance after the use of stock options. However, they use a sample of US companies to analyze the efficiency of option grants. Others, for instance, Ittner et al. (2002) concentrated on the new economy firms and Kedia and Mozumdar (2002) analyzes a sample of 200 largest companies in NASDAQ. Kato et al. (2005) provide some evidence of improvements in the performance of Japanese firms after the adoption of stock option plans. However, their sample is limited to the stock option announcements before 2001³. On the other hand, we use the most recent and long-term data, starting from the beginning of the stock option compensation in Japan (i.e., the data of all the firms of the Tokyo Stock Exchange, from 1997 to 2004). Our analysis is also different from the previous studies, which use a sample of US companies to associate the intensity of stock options with the firm's performance⁴.

The sample used in this research includes Japanese companies where the stock option compensation system is in the evolutionary stage and many companies are in the processes of adopting this form of compensation schemes. Additionally, we examine the behavior of management in response to the option grants to analyze the efficiency of such compensation schemes in Japan. We also analyze the role of executive ownership and bonuses for the improvements in the performance of a firm. The combination of these traditional instruments with the stock options can help to devise an optimal employment

³ A large number of Japanese companies adopted the stock option plans after the second amendments in the in the commercial code of Japan in 2001. These amendments alleviated the limits on the number of shares that can be granted as stock options as well as to whom the options can be granted, making it easier for the companies to use stock options as compensation for employees.

⁴ For instance, Core and Guay (2001), and Kedia and Mozumdar (2002) use a sample of US companies having already established option-based compensation system to analyze the association between the intensity of option grants and firm performance.

contract for the Japanese companies. This research also contributes to the research literature by investigating the association of the economic determinants of option grants with the option-grant intensity, for the performance gains. The findings of this analysis can help to bridge the differences in the research literature about why some firms are able to get greater benefits from the option grants compared to others.

1.5. Organization of the thesis

This dissertation starts with the introduction of the focus, objectives, motivation and contributions of this research. After the first introduction chapter, the next three chapters present the main research, analyses, and findings. The final chapter concludes the thesis.

Chapter-two initiates the research with the analyses of LTE and seniority-based compensation after the burst of the economic bubble in Japan. This chapter analyses the benefits, cost burdens, and functional prerequisites of the traditional system and investigates how the changes in the business environment can make it impossible to fulfill the functional prerequisites of the system. A representative sample of 158 companies from the electronics industry is used for the empirical analyses. The analysis explains when and how the traditional system can start putting a negative effect on the firm's performance. The findings of this analysis present the need to replace the seniority-based compensation system with a performance-based system. These findings provide the basis for the next two chapters that deals with the use of stock options as performance-based compensation in Japanese companies.

Chapter-three analyzes the motives, determinants, and expectations of using stock

options in Japanese companies. This chapter tests three different theories (i. e., agency theory, the retention and sorting model, and financial and ownership structures of the firms) to define the use of stock options. We calibrate these theories according to the Japanese business environment to test a variety of hypotheses. In order to investigate the potential motives of using stock options in Japanese companies, we analyze a sample of 12,896 firm-year observations of the companies listed in the Tokyo Stock Exchange (from 1997 to 2004). The main findings of this analysis include the differences in the motives of executive and employee stock options, and the role of risk and cash flow constraints in defining the decision to go for option-based compensation.

Chapter-four is about the performance consequences of stock option plans in the Japanese business environment. This chapter analyzes the effect of stock options for performance gains by using multiple measures of the firm's performance. Initially, it investigates the changes in operating-performance measures and then examines the reaction of market and management in response to the stock option plan announcements. Similar to the pervious chapter, sample for the empirical analyses includes the 12,896 firm-year observations of the companies listed in the Tokyo stock exchange (from 1997 to 2004). The evidence suggests improvements in the performance gains after the use of stock options. These performance gains are likely to improve when option grants are associated with the economic determinants of equity-based compensation. Findings of this analysis also leads to the conclusion that an optimal employment contract in Japan is possible with the combination of stock options, executive ownership, and bonuses.

Chapter-five presents the overall conclusions and implications of this research and explains the limitations associated with the analyses and results.

Chapter-two

End of lifetime employment and seniority-based compensation systems in Japan

2.1. Introduction

During the post-war economic miracle in Japan, the practice of lifetime employment (LTE) and seniority-based promotion (SBP) helped to explain the superior performance of Japanese companies. However, after the burst of the economic bubble, it became difficult for companies to maintain this traditional system. With the slowdown in the economy the costs associated with LTE overshadowed its positive effects. We try to find out when and how the disparity between the changes in economic environment and LTE structure can harm the profitability of companies.

The LTE system has a number of advantages, mainly in the areas of education, training and improving employees' firm-specific skills (Freeman and Rebeck, 1989). In addition, it helps to reduce turnover, absenteeism and waste by creating a highly productive and motivated workforce (Yoshimura and Anderson, 1997). Previous studies have acknowledged the advantages of the LTE system in the form of employee commitment, loyalty, devotion and mutual empathy (Peters and Waterman, 1982; Sethi et al., 1984; Fujiwara, 1989; Milgrom and Robert, 1995). However, less attention has been paid to the costs associated with the system. An analysis of the costs related to the LTE system may help to understand why this system collapsed after the burst of the economic bubble. This chapter addresses this issue by analyzing what types of costs are associated with the system and how these costs can increase to harm the profitability of a company.

We propose that some of the costs are present within the LTE system, while others are due to a disparity between the LTE structure and changes in the economic environment. About the former, Kandel and Pearson (2001) theoretically suggest that costs associated with the LTE structure can become more evident in the subsequent years

of implementation, when the number of long-tenured, highly paid employees increases in the company. About the latter, Sullivan and Peterson (1991) predict that this system needs continued growth and expansion of firms to produce positive results.⁵ It is especially difficult to fulfill the functional prerequisites of LTE and SBP when the proportion of senior employees in a company is large.

A crucial contributor to the costs concealed in the LTE system is the gradual increase in the number of long-tenured, highly paid employees. We explain it as an increase in the average employment tenure (AET) of workers in a company. A higher AET may increase the costs related to the functional prerequisites of the system. For instance, due to a steeper earning–tenure profile of lifetime employees, the rate of pay increase is higher in the latter half of employment tenure (Hashimoto and Raisian, 1985). This implies that a higher AET may create the additional payment to the senior workers. A related issue is that this system uses seniority as an absolute standard for promotion.⁶ As companies promote all their employees on the basis of seniority, the average cost of wages for the company rises.

On the other hand, with an increased AET level, the cost of maintaining the employment security would be much higher than with a lower AET. An increase in the AET level may also increase the intensity of other negative aspects of the LTE structure. These include decreased employee performance because of job security, low flexibility to alter the number of employees in case of changes in labor demand, diminished ability of

⁵ Peter Drucker predicted the same in 1975—that fast growth and expansion is a prerequisite for the LTE to produce positive results.

⁶ Ouchi (1981) explains that SBP is a core component of LTE policy. Without SBP, it is not possible to maintain the harmony and team spirit under the LTE structure.

the company to replace unproductive workers and difficulty creating large numbers of new positions for SBP. Though the AET level in a company may increase with a long-standing LTE policy, this increase remains invisible while the company is regularly hiring new employees. A sufficient number of new hiring helps to compensate the higher AET of existing employees. However, in the case of a reduction in hiring, a higher AET level can suddenly become visible.

We use the AET level in a company to explain the long-standing presence of an LTE structure and its associated costs. First, it explains the factors of the economic and demographic environments that can increase the AET level in a company in the presence of an LTE structure. Next, it analyzes how a higher AET level and overstaffing can harm the profitability of a company. We propose that hidden costs associated with the LTE system pileup gradually due to an increase in the AET in the company. These costs are concealed in the LTE structure from the very beginning, and remain invisible during a favorable economic environment. However, with a slowdown in the economy, these costs suddenly become evident. Though it is difficult to offset these costs in the short-term, a gradual implementation of performance-based pay and promotion can be the first step towards the solution.

The remainder of this chapter is arranged as follows. Section 2 briefly explains the evolution and growth of the LTE system in Japan. Section 3 presents the theoretical background and our hypotheses. Section 4 presents our model. Section 5 describes the sample and data source. Section 6 presents the empirical analyses and discusses the results. Section 7 gives conclusions and Section 8 addresses the limitations of this analysis.

2.2. Lifetime employment in Japan

The literature provides different views about the evolution and growth of the LTE system in Japan. Yoshimura and Anderson (1997) find the roots of the LTE system in the social and cultural values of Japanese society. Sullivan and Peterson (1991) try to link the beginning of LTE with the 1937 pro-Soviet centralized economic policies of the Japanese government. Others associate it with pressure from unions and desire of management to have more control over employees (Freeman and Rebeck, 1989). However, there is a consensus that the current structure of the LTE system started in the post–World War II era. The fast pace of economic growth and the rapid expansion of manufacturing industries in the 1950s provided the opportunity to hire and retain employees for longer times. As the labor supply was in shortage, it was favorable to adopt an LTE policy that could help retain employees (Hashimoto and Raisian, 1985). The positive features of the LTE system contributed to the profitability and competitiveness of firms. LTE fruitfully continued throughout the last several decades, when the Japanese economy was undergoing the post-war economic miracle.

However, since the early 1990s as the economy became sluggish, LTE and SBP came under pressure. Decreasing role of the main banks and transformations in corporate governance structure put pressure on firms to adopt a market-oriented style of management with performance-based pay systems.⁷ Still, companies were reluctant to change the traditional structure of employment for fear of losing their investment in

⁷ Recently, for instance, Ahmadjian (2001) explains the transformations in the traditional corporate governance structure of Japanese companies.

human capital (Kato, 2001). Social and cultural constraints both inside and outside of companies further limited any transformation process (Yoshimura and Anderson, 1997). However, the disparity between the LTE structure and changes in the economic environment made it difficult for the LTE system to fulfill its functional prerequisites. As a result, the LTE system that worked successfully for several decades gradually turned into a burden for companies.

2.3. Literature review and hypothesis development

The Japanese employment system is characterized by LTE, seniority-based pay and promotion, and enterprise unionism, which together are sometimes called the “three sacred treasures” of the Japanese model (Levine and Ohtsu, 1991; Ihara, 2004). For several decades, Japanese companies were able to continue this policy because of a rapidly growing economy. The long-term employment contracts provided an opportunity to invest in training and education to develop firm-specific skills for employees (Hashimoto and Raisian, 1989; Freeman and Rebeck, 1989). As a result, companies were able to maintain commitment, loyalty and mutual empathy among workers. This policy successfully created a highly productive workforce in a manufacturing-oriented economy (Ouchi, 1981; Fujiwara, 1989). The positive outcomes appeared in the form of reductions in turnover, absenteeism and waste, which helped to produce high-quality products (Peters and Waterman, 1982; Sethi et al., 1984).

However, the usefulness of an LTE policy depends on how large a burden a company has to bear in order to get the advantages of the system (Yang, 1984). The negative aspects of an LTE structure may emerge in the form of decreased performance

competition among employees, low flexibility of the company to change its size in response to any technological developments and a bureaucratic decision making structure. Similarly, an LTE policy limits the ability of a company to fire or replace a lazy worker (Smith, 1997). In addition to these negative aspects, the LTE system has to expend a significant amount of cost to maintain itself. There are two types of costs. The first is the cost of maintaining employment security, which presents itself as having surplus workers during delays in employment adjustment. The second is the higher wages paid to promoted workers. The SBP system offers more regular and generous opportunities for promotion by way of an absolute standard for promotion (Hashimoto and Raisian, 1989). Consequently, as companies promote more workers, the cost of their cumulative salaries increases (Dirks et al., 2000). It is important to note that in the LTE system, wages rise with employment tenure, even where there is no promotion (Nakamura, 2000; Ueshima, 2003). This means that the cost of wages for a company increases when employees remain with the company for many years.

On the other hand, it is difficult to fulfill the requirements of SBP when there are a lot of senior employees for whom a company is unable to produce new positions. This creates a frustration among the employees waiting for promotion in long queues. With the rapid aging of Japanese society, an LTE structure can make retirement and pension benefits vulnerable. Competition in the international market may further increase the pressure to reduce the costs of production.

It is important to note that most of the costs of an LTE structure are associated with the presence of a large number of long-tenured, highly paid employees in a company (i.e., a higher AET level). A higher AET level can raise the cost of LTE in a number of

ways. First, it may increase the intensity of the negative aspects of an LTE policy. Second, it may create new costs in the form of additional payments to promoted workers. Third, when a company has a large number of highly paid employees, the cost of maintaining their employment security is much higher.

Though the AET level gradually increases with a long-standing LTE structure, it remains invisible while the company is able to hire a significant number of new employees every year. The addition of new employees helps to maintain the AET at normal level. However, in case of a decrease in hiring, the AET of existing employees start increasing rapidly. Thus, a high AET is likely to be more visible in companies that have been employing the LTE system widely and comprehensively in the past. We use the AET level of a company as a surrogate for the LTE structure and its associated costs. First, we analyze how a long-standing LTE policy and the changes in the economic and demographic environments can increase the AET level in a company. Next, we look for the effect of an increased AET level and overstaffing on the profitability of Japanese companies.

2.3.1. Factors contributing to an increased AET level

Japanese companies widely adopted LTE policies during the decades after World War II. At the initial adoption of LTE, the overall AET is not very high. However, when most of the employees continue with the same company, the AET level gradually increases. Thus, a higher AET level may become visible with an increase in the age of a company.

Hypothesis: H-2.1.1: The AET level increases with the age of a company.

The average workforce age in Japan has increased due to a rapid aging of Japanese society over the last two decades⁸. In a company following an LTE policy, an increase in the age of employees may raise the employment tenure proportionally. Therefore, in the context of a long-standing presence of LTE in Japan, a company with an older workforce is likely to have a greater number of employees with long employment tenures.

Hypothesis: H-2.1.2: The AET level in a company increases with an increase in employees' age.

Traditionally, larger companies adopted the LTE policy more often than smaller companies did. There are two reasons for this. First, large companies have less chance of failure in the short-term and they can therefore invest in long-term employment contracts with an expectation of retaining employees for a longer time. Second, the internal labor market is better developed in big companies, allowing them to redistribute surplus employees within the company (Hashimoto and Raisian, 1989). Consequently, the chances of having a large number of long-tenured employees are greater in bigger companies.

Hypothesis: H-2.1.3: Bigger companies are more likely to have a high AET level than smaller companies.

Unions put pressure on company management not to lay-off employees. They demand more job security and limit the ability of employers to transfer or fire employees (Foulkes, 1981; Hoerr, 1991). Union presence may also threaten the control of

⁸ Figure 2.3 present the changes in the composition of the Japanese population since 1950. The age group of 65 years and more, has increased from 4.9% in 1950 to 19.1% in 2003 and expected to reach 35.7% by the year 2050.

management over employees (Cooke, 2001). Therefore, in a unionized company, management may offer job security as a tool to negotiate with the unions on other issues. Moreover, the presence of a union also indicates the presence of a significant number of permanent employees in the company. Thus, the presence of a union can make the environment more favorable for an LTE policy.

Hypothesis: H-2.1.4: The long-term presence of a union increases the AET level in a company.

When there are a variety of skill and knowledge requirements in a company, it is comparatively difficult to retain employees by redeploying them in different divisions (Kandel and Pearson, 2001). In the case of growth in an existing division or the establishment of a new division, it is more favorable to hire employees from the outside with the specific expertise needed. Therefore, a company that requires a variety of skills and knowledge is likely to have fewer employees with a long employment tenure.

Hypothesis: H-2.1.5: A variety of skills and knowledge requirements decrease the AET level in a company.

Most importantly, a single factor that can balance the effect of all the other factors on increasing the AET level is the regular addition of new employees. When a company is growing and expanding rapidly, regular hiring of new, entry-level employees can offset a high employment tenure of existing senior employees. In this way, the overall AET remains unchanged even while existing employees are retained. However, continuous hiring is not feasible during an economic slowdown. When there is a need for downsizing, a common practice in Japan is to redistribute existing employees within the company and

reduce or stop the hiring of new workers.⁹ However, when companies do not bring in new employees, the AET level for the existing employees increases more rapidly with every subsequent year. Therefore, a company with a low tendency for hiring new employees should expect to have a higher AET level in the presence of an LTE policy. This leads to the following hypothesis.

Hypothesis: H-2.1.6: A tendency for hiring new employees decreases the AET level in the company.

2.3.2. Effect of an increase in AET and overstaffing on profitability

A long-standing LTE policy and adverse changes in the economic and demographic environment can result in a higher AET level in a company. In the presence of an LTE policy, an increase in the AET level may increase a number of direct and indirect costs. A higher AET level may increase the direct costs in the form of additional payment to promoted workers. Consequently, maintaining the employment security for these highly paid employees also becomes more costly. Hashimoto and Raisian (1985, 1989 and 1992) report a steeper earning–tenure profile for lifetime employees. This implies that the rate of increase in pay is low in the beginning years, but is high in the later years. Therefore, in the first half of employment tenure, employees get paid less than their contributions to the company. However, in the second half of employment tenure, employees get more pay than their contributions to the company. The balance of total employee contributions to a company against the total wages paid to employees can be negative when more employees are in the second half of their employment tenure (i.e.,

⁹ For instance, Kato (2001) observes that such adjustments are common in Japanese companies.

a higher AET level in the company). Thus, both the cost of additional payment to promoted workers and cost of maintaining employment security may increase with an increase in the AET level. The later cost remains invisible in a favorable economic environment. However, as the LTE policy makes it difficult to adjust the labor input, it is difficult to offset this cost when labor demand declines (Abraham and Houseman, 1989).

Together with these direct costs, a higher AET level may increase the intensity of some indirect costs. These include decreased performance competition among employees,¹⁰ diminished ability of a company to get innovative ideas because of a large number of stagnant employees and a slow decision making process due to many layers of management. Additionally, the company is unable to change its size in response to technological developments (Kalleberg et al., 2000). The LTE policy not only limits the company's ability to lay off incompatible employees, but also makes it difficult to hire new employees. This can create problems for transitions that the company may need to make in response to technological changes.

When a company is not expanding, advancement of senior employees can create a "jam-effect" for promotions.¹¹ From the employees' perspective, firm-specific skill and experience seriously reduces the ability to move to other companies, and permanent employees become a burden for the company (Smith, 1997; Pohlman et al., 2000;

¹⁰ Decreased performance competition applies not only within the company, but also to potential employees outside the company. Therefore, a company is unable to assess and utilize competent people outside the organization.

¹¹ Dirks et al. (2000) explain that with SBP, it is difficult to promote all the employees because of the limited number of positions available at the higher levels in the organizational structure. Previously, during the time of continuous expansion, Japanese companies were able to do this by creating new positions. However, this is not possible in times of slow growth.

waterman et al., 1994). The rapid aging of Japan society and pensions tied to an employee's salary at retirement can further increase the burden of LTE on a company (Clark and Ogawa, 1992). These issues are all the byproducts of the LTE system; however, a higher AET level may increase the intensity of these negative aspects. Thus, it is reasonable to propose that a higher AET level can harm the profitability of a company.

Hypothesis: H-2.2.1: A higher AET level has a negative effect on the profitability of a company.

Overstaffing is another problem created by not laying-off enough employees when demand declines. In Japan, the state of both internal and external environments changed rapidly after the burst of the economic bubble. With a decrease in demand, LTE companies were not able to utilize all of their permanent workers, but they had to keep them on with full wages (Hori, 1993). Surplus hiring during times of rapid economic growth was responsible for this in-company unemployment, which became serious when demand declined (Suzuki, 1996). Based on the preceding discussion, it is plausible that a long-standing LTE policy and adverse environmental changes lead to overstaffing in companies. Thus, a higher staffing ratio can put a negative effect on the profitability.

Hypothesis: H-2.2.2: A higher staffing ratio causes a negative effect on the profitability of a company.

When profitability is set as a dependent variable, one must consider a number of other factors that may have an effect on it. For instance, some companies may have a historically positive trend in profitability due to brand power, an innovative product, modern technology or some other competitive advantage. Additionally, the nature of the product line, product style, market trends and advertising efforts made by a company may

also affect profitability. As it is not feasible to obtain data on all of these aspects, we include three representative factors: *stock-market performance*, *historical trend in profitability*, and *change in sales volume*.

Hypothesis: H-2.2.3: Profitability is positively associated with the historical trend in the profitability of a company.

Hypothesis: H-2.2.4: Profitability is positively associated with the stock-market performance of a company.

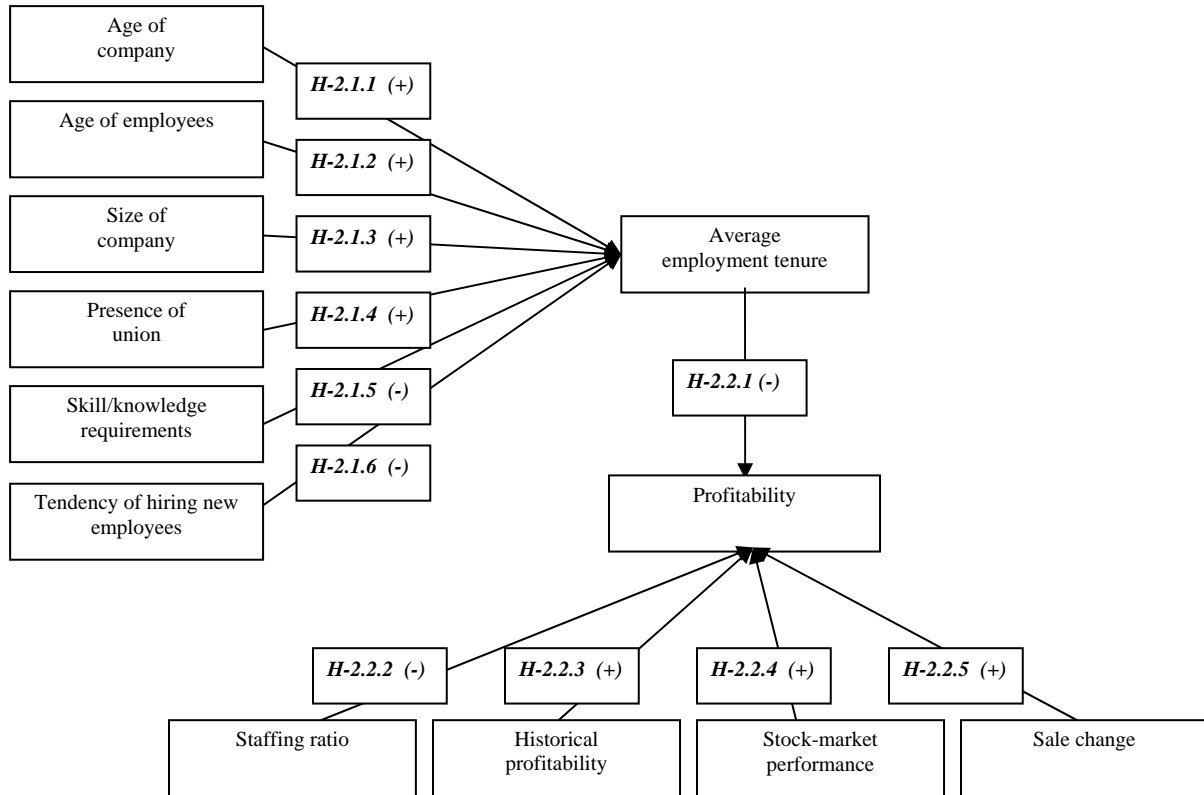
Hypothesis: H-2.2.5: An increase in sales volume positively affects the profitability of a company.

2.4. Arrangement of the model

The preceding discussion suggests the arrangement of the model, as shown in Figure 2.1. The direction of the hypotheses and the expected signs are also shown in the figure. We use a recursive model of one-way relationships among the variables. The six different factors causing a change in the AET level are part of the internal and external environments of the company. These factors can pileup AET in the company both because of a long tradition of LTE itself and because of changes in the economic and demographic environments. Therefore, a reverse relationship does not seem to be logical. Similarly, given the deep-rooted history of LTE structure in Japan, a direct and immediate effect of profitability on the overall AET level in a company is unlikely. However, with an increase in the AET level, the negative aspects of LTE become evident and affect the profitability of a firm.

Figure 2.1

Arrangement of model



Note: (+), (-) and (→) show the signs and directions of the hypotheses.

2.5. Sample and data source

For the empirical analyses, the electronics industry is selected as the sample. It is one of the major industries in Japan, and has had an important role in the post-war economic miracle. This industry has experienced a high growth rate due to rapid technological improvements in last several decades. Japanese electronics companies routinely adopted the LTE policy and hired extensively during times of rapid growth,

which were followed by an economic decline. Therefore, the electronics industry is a typical example of the rise and fall of the LTE system in Japan.

Additionally, the costs of an LTE structure may be more crucial for the electronics companies. There are several reasons for this. First, due to recent developments and innovations in electronics products, these companies need specialists having up-to-date knowledge and skills in a specific area rather than general skills specific to a company. An LTE structure may no longer be an optimal choice for these companies. The formation of firm-specific skill in the LTE system can also limit these companies' access to innovative ideas. Second, as an export-oriented manufacturing industry, the competitiveness of these companies is very sensitive to the cost of production. The intensified price competition in the international market requires reducing this cost with a performance-based pay system.¹² On the other hand, with the decreasing role of main banks, these companies are trying to access the international capital market. Therefore, the electronics industry is strongly exposed to the transitions in the traditional corporate governance structure in Japan. In this context, the electronics industry is an appropriate sample to analyze the costs associated with the traditional LTE system.

Data on the sample companies were collected from the Nikkei Annual Corporation Reports (Kaisha Nenkan). In some cases, we also utilized data from the Electronic Disclosure for Investors' Network (EDINET).¹³ Data were collected for four

¹² In the international market, Japanese companies have to compete with the other companies who have a performance-based compensation system, which is more economical than LTE.

¹³ The EDINET database is available from the website of the Financial Services Agency of Japan (<http://www.fsa.go.jp>).

consecutive years (2002, 2001, 2000, and 1999). For variables such as a company's historical profitability and the presence of a union, the data are collected over the last ten to fifteen years. Initially, a sample of 218 publicly traded companies in the electronics industry was selected. The average age of the companies in this industry is 55 years and the overall AET is fifteen years. Therefore, for the companies established during the last decade and a half, it is not possible to reflect the increases in the AET. Based on this, only those companies who have an age of more than fifteen years are included. This reduced the sample from 218 to 199 firms. Some of the companies were excluded from the sample for which data were not available for all of the last fifteen years. This further reduced final sample to 158 companies. Figure 2.2 shows the AET in the electronics industry for different years. Contrary to some lay reports, the figure presents an increasing trend in AET levels during the 1990s: the AET level increased from 11.9 in 1985 to 15.6 by 2002.

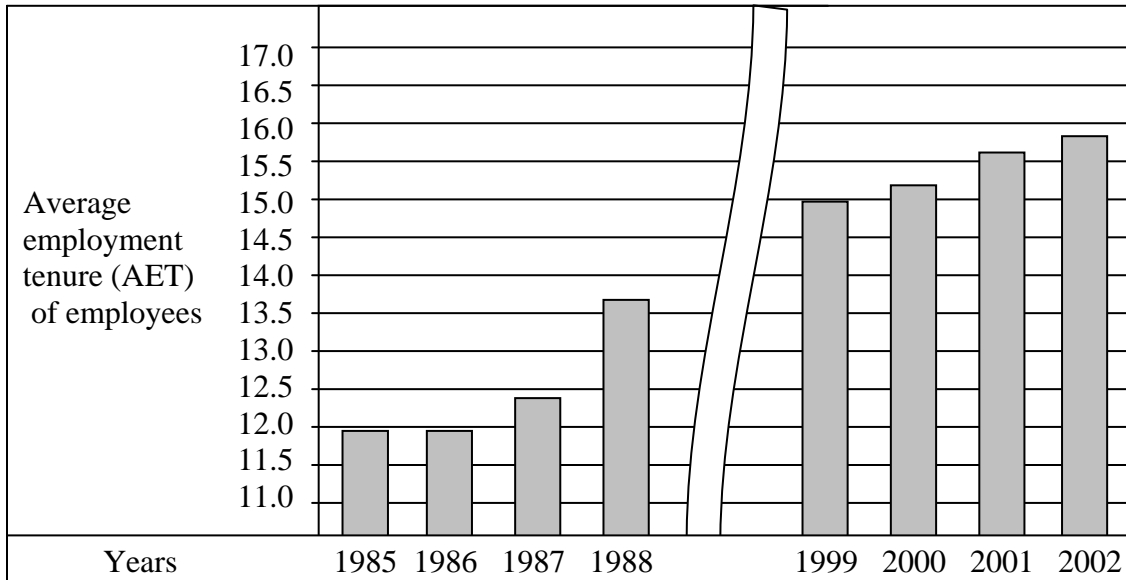
Figure 2.3 present the rapid aging of the Japanese society during past one decade. This increase in the average age of the population ultimately effected the average age of work force in Japan. Figure 2.4 shows the average age of employees in the electronics industry. The average age has increased from 34.5 years in 1985 to 38.5 years in 2002. The increase in the AET level with an increase in the average age is consistent with the presence of an LTE structure in these companies.

2.6. Empirical analysis

We analyze the data in three parts. In the first part, we use linear regression to see the effect of different factors on increasing the AET level in companies. In the

Figure 2.2

Average employment tenure (AET) of employees in the electronic industry

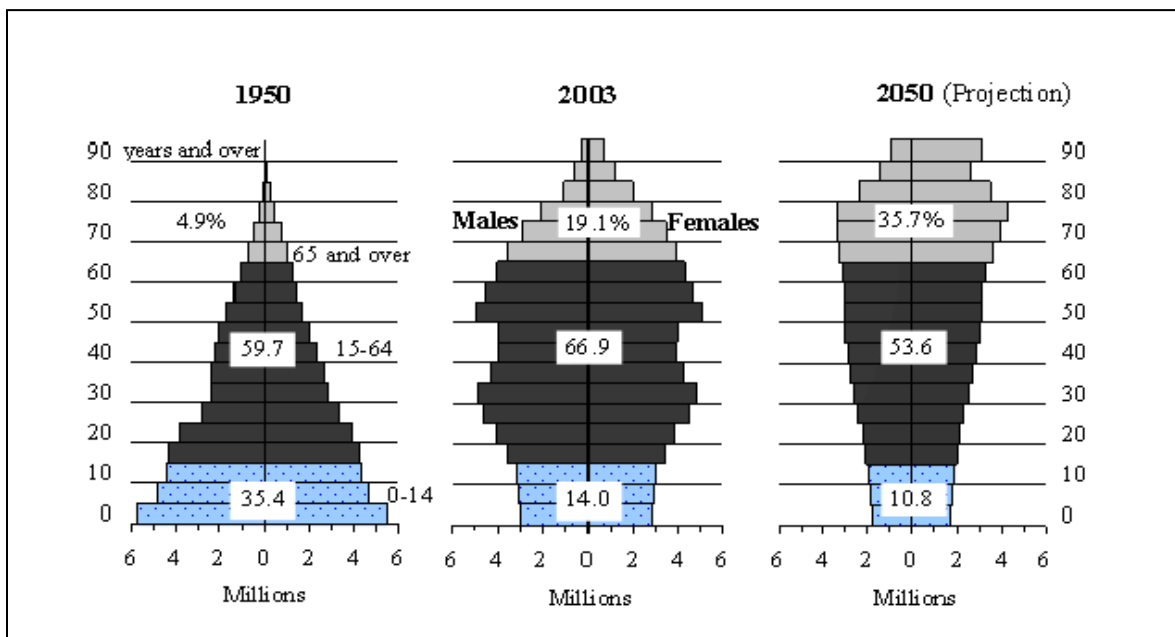


Note: The sum of the years of employment with the existing company divided by the total number of employees equals the ‘average employment tenure of employees’ (AET).

Source: Data taken from Nikkei Annual Corporation Reports (Kaisha Nenkan)

Figure 2.3

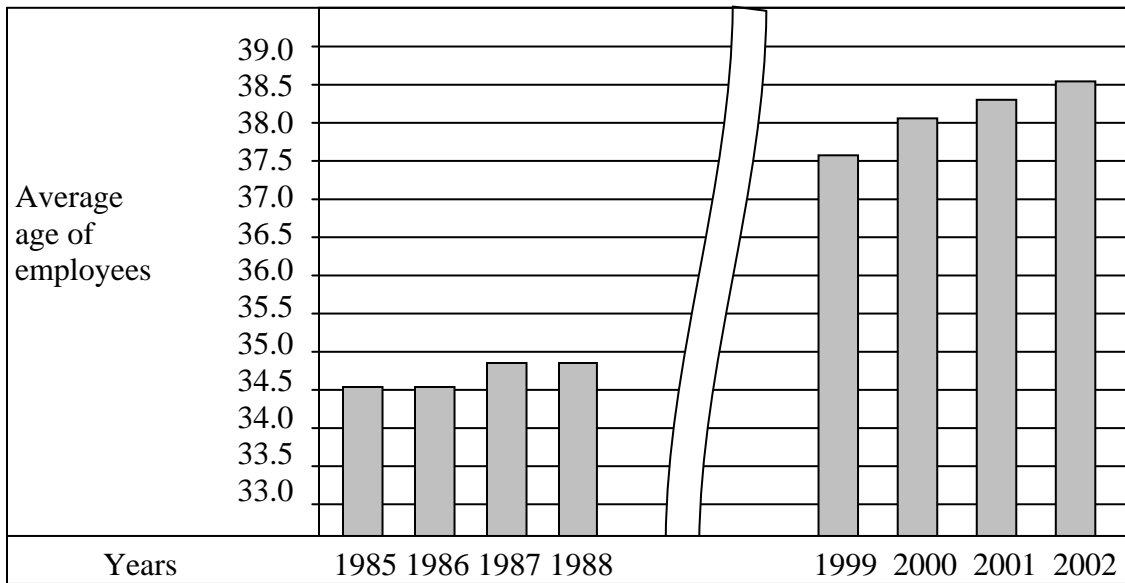
Changes in the age-group composition of the Japanese population



Source: Statistics bureau, Ministry of Health Labor and Welfare, Japan.

Figure 2.4

Average age of employees in the electronic industry in Japan



Note: The sum of the ages of the employees divided by the total number of employees equals the ‘average age of employees’.

Source: Data taken from Nikkei Annual Corporation Reports (*Kaisha Nenkan*)

second part, we analyze the effects of a higher AET level and overstaffing on the profitability of companies. In the third part, we include all the variables into a single proposed model, and use LISREL to see the coefficient values and model fit indexes for the full model.

2.6.1. Factors contributing to an increased AET level

This part tests hypotheses *H-2.1.1* to *H-2.1.6*. The dependent variable is the AET level in a company, denoted by AVTENUR, which is the sum of the employment tenure of all the employees in a company divided by the total number of employees.

2.6.1.1 Independent variables

Six independent variables are used in this part. Table 2.1 lists the variables' labels, expected signs, means and standard deviations. AGECOMP is the age of a company, in years. AGEMPL is the average age of employees in a company, calculated as the sum of the ages of all employees divided by the total number of employees. COMPSIZE is the log of total number of employees in a company. UNION is a dummy variable indicating the long-standing presence of a union in a company; it is assigned a value of one if a union has been present for the last fifteen years, and zero otherwise. SEGMENT is the number of business segments in a company—a proxy for the skill and knowledge requirements of a company. NEWEMPL denotes a company's tendency for hiring new employees; it is the percentage change in employees since the previous year.

2.6.1.2. Results and discussion

Table 2.2 shows a Pearson correlation matrix and co-linearity statistics of the independent variables. Table 2.3 shows the results of the regression analyses. We first use four separate regressions for the years 1999 to 2002. In the second step, we combine the four years together and include a time-dichotomized variable (YEAR) in the regression to investigate any major difference that might exist. The regression found no significant difference with respect to year.

The regressions show an increase in the AET level with an increase in company age and age of the employees, which is consistent with the idea that a higher AET level becomes evident with a long-standing LTE system. Companies who adopted LTE policies many years ago and fail to respond to the changing economic environment are

Table 2.1

Descriptive statistics of independent variables (combined data)^a

| Variable | Description | Expected sign | Mean | Median | Std. Dev. | Min. | Max. | Skewness |
|----------|----------------------------------|---------------|-------|--------|-----------|--------|--------|----------|
| AGECOMP | Age of company | Positive | 54.23 | 52 | 15.27 | 21.00 | 103.00 | 0.41 |
| AGEMPL | Average age of employees | Positive | 38.16 | 38.40 | 2.83 | 29.03 | 45.93 | -0.39 |
| COMPSIZE | Log of total number of employees | Positive | 7.26 | 7.03 | 1.24 | 5.05 | 11.10 | 0.38 |
| UNION | Presence of union | Positive | 0.82 | 1.00 | 0.39 | 0.00 | 1.00 | -1.03 |
| SEGMENT | Number of segments | Negative | 3.46 | 3.00 | 1.47 | 1.00 | 7.00 | 0.19 |
| NEWEMPL | Percentage change in employees | Negative | -2.89 | -2.23 | 6.03 | -17.85 | 12.76 | -0.26 |

^a AGECOMP is the age of a company, in years. AGEMPL is the average age of employees in a company, calculated as the sum of the ages of all employees divided by the total number of employees. COMPSIZE is the log of total number of employees in a company. UNION is a dummy variable indicating the long-standing presence of a union in a company; it is assigned a value of one if a union has been present for the last fifteen years, and zero otherwise. SEGMENT is the number of business segments in a company—a proxy for the skill and knowledge requirements of a company. NEWEMPL denotes a company's tendency for hiring new employees; it is the percentage change in employees since the previous year.

Table 2.2

Co-linearity statistics and correlation matrix of independent variables (combined data)

| Variable Label | Co-linearity statistic | | Pearson correlation | | | | | | |
|----------------|------------------------|------|---------------------|---------|--------|---------|------|---|--|
| | Tolerance | VIF | 1 | 2 | 3 | 4 | 5 | 6 | |
| 1- AGECOMP | 0.72 | 1.38 | 1 | | | | | | |
| 2- AGEMPL | 0.77 | 1.29 | 0.42** | 1 | | | | | |
| 3- COMPSIZE | 0.76 | 1.30 | 0.35** | 0.06 | 1 | | | | |
| 4- UNION | 0.91 | 1.09 | 0.17** | 0.25** | 0.22** | 1 | | | |
| 5- SEGMENT | 0.84 | 1.17 | 0.04 | -0.08 | 0.29** | 0.07 | 1 | | |
| 6- NEWEMPL | 0.97 | 1.02 | -0.02 | -0.10** | 0.08* | -0.12** | 0.01 | 1 | |

*significant at the 5 percent level; **significant at the 1 percent level

struggling with a higher AET level. The research conducts is with a special reference to the long history of the LTE system in Japan. The results explain the situation in which the AET level increases because of a disparity between the long-standing presence of the LTE systems and adverse changes in the economic environment. This is inline with Kato (2001), who states that, due to a reluctance of Japanese companies to change, the LTE system is still prevalent, but in a disguised form. The rapid aging of Japanese society is another reason for increasing AET levels.

The regressions show that the problem of an increased AET level is more visible in big companies. This is consistent with Hashimoto and Raisian (1985), who report that big companies adopted the LTE policy more often than small companies did. The data support hypothesis *H-2.1.4* to some extent, showing that pressure from unions for job security also had an effect on maintaining the LTE policy.

Table 2.3

Factors contributing to an increased AET level of employees in the company ^a

| Variable | 1999 | 2000 | 2001 | 2002 | Combined Data | Combined with year dummies |
|---------------------|-----------------------|-----------------------|-----------------------|---------------------|-----------------------|----------------------------|
| Intercept | -26.09*** (-16.18) | -26.65*** (-14.37) | -27.89*** (-18.20) | -27.10*** -15.80 | -27.10*** (-33.84) | -27.34*** (-33.61) |
| AGECOMP | 0.14*** (3.87) | 0.16*** (3.65) | 0.11*** (2.71) | 0.09*** (2.81) | 0.11*** (6.34) | 0.11*** (6.38) |
| AGEMPL | 0.82*** (22.66) | 0.76*** (19.35) | 0.84*** (25.07) | 0.83*** (22.01) | 0.81*** (46.74) | 0.82*** (46.41) |
| COMPSIZE | 0.14*** (3.57) | 0.14** (3.71) | 0.17** (4.71) | 0.15** (4.33) | 0.16*** (9.55) | 0.16*** (9.43) |
| UNION | 0.04 (1.20) | 0.07 (2.39) | 0.04 (1.14) | 0.03 (0.92) | 0.03** (1.86) | 0.03** (1.84) |
| SEGMENT | -0.03 (-0.80) | 0.01 (0.26) | -0.02 (-0.60) | -0.02 (-0.55) | -0.02 (-1.67) | -0.02 (-1.06) |
| NEWEMPL | -0.02 (-0.52) | -0.03 (-0.92) | -0.03 (-1.38) | -0.05 (-2.04) | -0.03** (-1.90) | -0.03** (-2.11) |
| YEAR99 | | | | | | 0.04 (0.95) |
| YEAR00 | | | | | | 0.02 (1.01) |
| YEAR01 | | | | | | 0.01 (0.86) |
| Adj. R ² | 0.87 | 0.81 | 0.85 | 0.83 | 0.85 | 0.85 |
| F-Value | 168.89*** | 112.85*** | 161.24*** | 128.54*** | 622.98*** | 417.24*** |
| Number of cases | 158 | 158 | 158 | 158 | 632 | 632 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses report the *t*-statistics computed on the bases of robust standard errors

^a The dependent variable is the average employment tenure of employees (AVTENUR) in the company. It is the sum of the employment tenure of all the employees in a company divided by the total number of employees.

The data are able to partially support hypothesis *H-2.1.5* for some years. This might be because of the phenomenon of *job rotation* in Japanese companies, which may have made internal re-employment possible¹⁴ and minimized the effect of the requirement for a variety of skills and knowledge on decreasing the AET level. Most importantly, the results accommodate the prediction of Sullivan and Pearson (1990) that rapid economic growth and expansion are prerequisites for the LTE structure. Results support the idea that, when companies are growing, they can keep the AET at a lower level by continually hiring new employees. However, this is not possible when the company has a decreased tendency for hiring new employees.

2.6.2. Effect of increase in the AET and overstaffing on profitability

Here, we examine hypotheses *H-2.2.1* to *H-2.2.5*. The dependent variable is profitability of a company, denoted as PROFITAB, which is measured by its return on assets ratio (ROA).

2.6.2.1. Independent variables

Table 2.4 shows the variable labels, expected signs, means and standard deviations of the independent and control variables. This part uses the AET level to represent the effect of an LTE structure on profitability. It is again measured using AVTENUR, as in the previous section. STAFRATIO is the level of staffing, measured as

¹⁴ Because of Job rotation in Japanese companies, employees are able to get know-how about the operations other than their main working area. This makes it possible for the company to adjust the employees in other departments. However, in such cases the productivity of these adjusted employees may be far less than the specialists in that area.

Table 2.4

Descriptive statistics of independent variables (combined data)^a

| Variable label | Description | Expected Sign | Mean | Median | Std. Dev. | Min | Max | Skewness |
|----------------|--|---------------|------|--------|-----------|--------|-------|----------|
| AVTENUR | AET of employees in a company | Negative | 15.2 | 15.50 | 3.65 | 3.89 | 28.11 | -0.25 |
| STAFRATIO | Ratio of the total employees to the total assets | Negative | 0.02 | 0.08 | 0.01 | 0.01 | 0.23 | -0.12 |
| HISPERF | Historical performance | Positive | 1.79 | 1.35 | 2.66 | -4.63 | 7.74 | 0.30 |
| STOKPER | Percentage change in market value | Positive | 1.95 | 1.88 | 45.40 | -80.74 | 99.71 | 0.44 |
| SALCHANG | Percentage change in sale | Positive | 0.15 | 1.04 | 23.60 | -43.60 | 44.20 | -0.37 |

^a AVTENUR, is the sum of the employment tenure of all the employees in a company divided by the total number of employees. STAFRATIO is the level of overstaffing, measured as the total number of employees divided by the total assets of a company. This variable gives the level of employment in a company per dollar of assets. The variable HISPERF reflects the historical profitability of a company; it is measured as the average ROA over the last five years. STOCKPER reflects a company's stock-market performance; it is measured as the percentage change in the market value of the firm (stock price × number of shares outstanding). The variable SALCHANG is the percent change in sales since the previous year.

the total number of employees divided by the total assets of a company. This variable gives the level of employment in a company per dollar of assets. A higher value indicates overstaffing. Industries may vary in the human-to-financial assets ratio they require. Limiting our studying to one industry help avoid this variability.

2.6.2.2. Control variables

The variable HISTPERF reflects the historical profitability of a company; it is measured as the average ROA over the last five years. STOCKPER reflects a company's stock-market performance; it is measured as the percentage change in the market value of the firm (stock price \times number of shares outstanding). The variable SALCHANG is the percent change in sales since the previous year.

2.6.2.3. Results and discussion

Table 2.5 shows the Pearson correlation matrix and co-linearity statistics for the independent variables. As with the analyses in the previous section, the data are analyzed for four years separately, and then combine them into one regression by including a time-dichotomous variable (YEAR). Our analysis does not show any significant differences across the years, nor were the main determinants of our model affected by the addition of YEAR. Table 2.6 shows the results of the regression analyses.

The results are consistent with the hypothesis that an increase in the AET level will increase the costs of an LTE structure. Thus, the change in AET level is an important factor for determining the value of an LTE policy in a certain economic environment.

Table 2.5

Co-linearity statistics and correlation matrix of independent variables (combined data)

| Variable Label | Co-linearity statistic | | Pearson correlation | | | | |
|----------------|------------------------|------|---------------------|---------|-------|------|---|
| | Tolerance | VIF | 1 | 2 | 3 | 4 | 5 |
| 1- AVTENUR | 0.89 | 1.11 | 1 | | | | |
| 2- STAFRATIO | 0.95 | 1.04 | 0.15** | 1 | | | |
| 3- HISPERF | 0.91 | 1.09 | -0.27** | -0.15** | 1 | | |
| 4- STOKPER | 0.96 | 1.03 | -0.17** | -0.07** | 0.09* | 1 | |
| 5- SALCHANG | 0.99 | 1.00 | -0.01 | 0.03 | 0.02 | 0.07 | 1 |

significant at 5 percent level; *significant at 1 percent level

Since a higher AET level is evident with the long-standing presence of the LTE policy, the cost burdens of an LTE structure may increase gradually, becoming more visible in the subsequent years of implementation.

On the other hand, AET level also increases when companies are not able to hire sufficient numbers of new employees. A decrease in the expansion of the firm makes it difficult to maintain the SBP. Thus, negative effects of a higher AET are consistent with Sullivan and Pearson's (1990) prediction that changes in the internal and external environments of company make it difficult for the traditional LTE system to fulfill its functional prerequisites.

Hashimoto and Raisian (1985) explain that, due to steeper earning–tenure profiles, the amount of pay employees receive is higher than their contributions in the later half of their employment tenure. The results indicate a negative effect of higher AET on the profitability of a company, which supports Hashimoto and Raisian's proposition.

Table 2.6Effect of increase in AET and overstaffing on profitability ^a

| Variable | 1999 | 2000 | 2001 | 2002 | Combined data | Combined with year dummies |
|-----------------|-------------------|--------------------|--------------------|--------------------|--------------------|----------------------------|
| Intercept | 2.22* (1.66) | 3.30* (2.70) | 8.08** (2.70) | 3.39** (2.33) | 4.18** (5.99) | 3.16** (4.36) |
| AVTENUR | -0.12* (-1.52) | -0.20** (-2.81) | -0.32** (-4.91) | -0.18** (-2.65) | -0.20** (-5.87) | -0.20** (-5.96) |
| STAFRATIO | -0.10* (22.66) | -0.04 (-0.43) | -0.07 (-1.07) | -0.09 (-1.27) | -0.10** (-2.91) | -0.10** (-2.86) |
| HISPERF | 0.24** (3.32) | 0.28** (3.86) | 0.30** (4.58) | 0.35** (5.03) | 0.28** (8.07) | 0.28** (8.27) |
| STOKPER | 0.15* (1.99) | 0.17* (2.28) | 0.20** (3.30) | 0.20** (3.09) | 0.10** (2.51) | 0.16** (4.30) |
| SALCHANG | 0.21** (2.85) | 0.17** (2.39) | 0.20** (3.27) | 0.27** (4.04) | 0.29** (8.80) | 0.20** (5.91) |
| YEAR99 | | | | | | -0.00 (-0.09) |
| YEAR00 | | | | | | 0.07 (1.35) |
| YEAR01 | | | | | | 0.10* (3.47) |
| Adj. R^2 | 0.24 | 0.21 | 0.41 | 0.34 | 0.29 | 0.35 |
| F-Value | 10.05*** | 9.19*** | 22.53*** | 16.79*** | 52.70*** | 41.96*** |
| Number of cases | 158 | 158 | 158 | 158 | 158 | 158 |

* significant at 10 percent level; **significant at 5 percent level; ***significant at 1 percent level

Note: numbers in parentheses report the t -statistics computed on the bases of robust standard errors.^a The dependent variable is profitability (PROFITAB). It is the return on asset ratio of the company.

Additionally, the results confirm that the cost of maintaining employment security can be higher for the companies with large numbers of long-tenured, highly paid employees. These results are also consistent with LTE disadvantages from decreased employee performance because of job security, low flexibility, and with difficulty maintaining SBP becoming more evident with higher AET levels.

Overstaffing is another byproduct of the disparity between LTE and the current economic environment. Redundant employees on a company's payroll decrease its competitiveness. With a long history of an LTE policy, it is difficult to offset this burden in the short-term. In sum, the results support the negative effect of overstaffing on profitability.

2.6.3. The combined effect of all the variables in one model

This part analyzes the combined effect of all the variables in a single model using LISREL. For this analysis, the Pearson correlation matrix is utilized. The variable labels and measures are the same as in the previous parts.

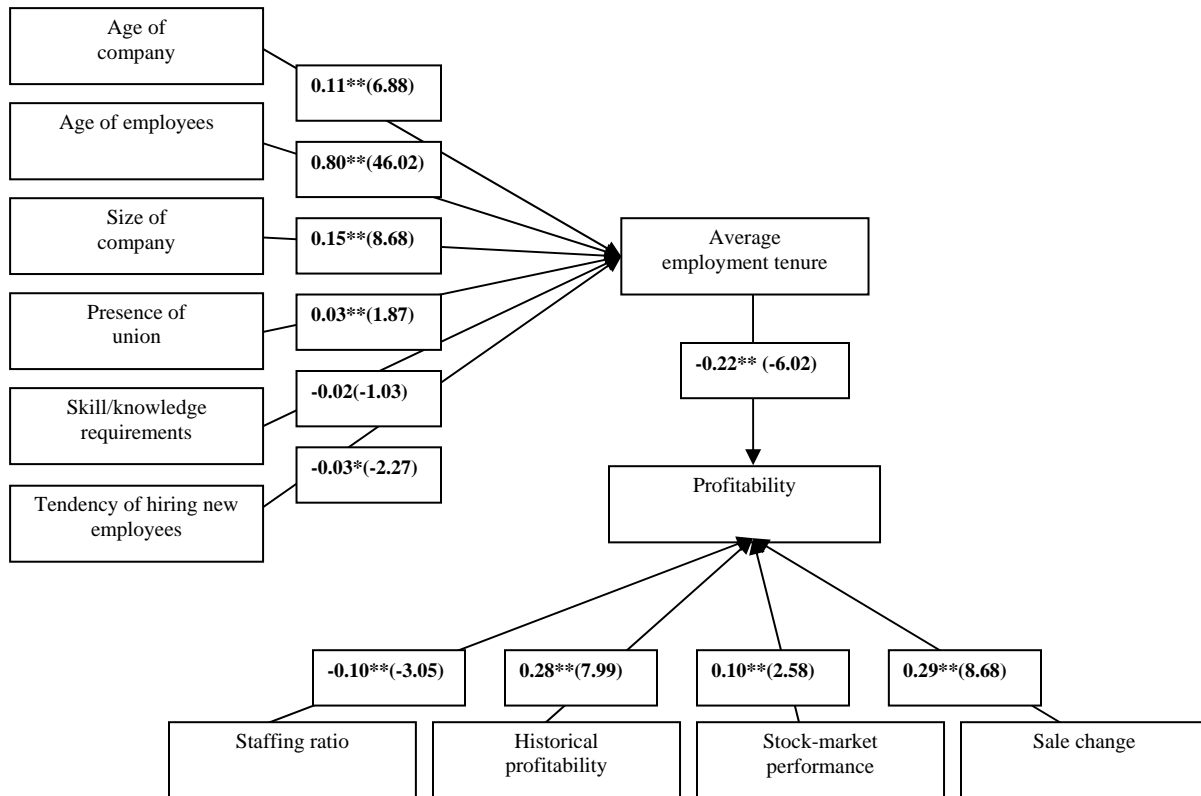
2.6.3.1. Results and discussion

Figure 2.5 presents the LISREL output, showing the coefficient values, significance levels and the model's fit indexes. The results are consistent with the findings from the previous two parts. The model shows that, when the environmental factors are supportive of LTE structure, the AET level does not increase. However, when there is a disparity between them, it causes an increase in the AET level.

The costs of higher AET level negatively affect profitability. Thus, a favorable economic environment and rapid growth are important for LTE to produce a positive

Figure 2.5

LISREL output of full model, showing coefficient values, signs and model fit indexes



*significant at the 5 percent level, **significant at the 1 percent level

Note: numbers in parentheses are Wald statistics

Chi-square = 9.46

Goodness of Fit Index (GFI) = 0.99

Degree of freedom = 10

Adj. goodness of fit Index (AGFI) = 0.93

P- Value = 0.13

Comparative Fit Index (CFI) = 0.99

RMSEA = 0.017

Incremental Fit Index (IFI) = 0.99

value for a company. The negative effects created by the long-standing presence of this system can become more visible when there is a slowdown in economic growth. The value of LTE for the company depends upon how much the environment is willing to support this process running positively. While LTE structures necessarily have to follow

SBP, demographic factors such as rapid aging of society can further increase the costs of such a system.

2.7. Conclusions

This chapter studies the long-established practice of LTE in Japanese companies. The LTE system emerged in Japan during the post-war economic miracle. This system produced a number of positive outcomes by a successful combination of speedy economic growth and long-term employment contracts for employees. However, after the burst of the economic bubble in Japan, the traditional system came under pressure, and people began to question whether this practice was a cause or an effect of the rapid economic growth in Japan. The findings suggest that, while the LTE system might have helped to accelerate economic growth, it also was supported by this growth. Thus, economic growth and the LTE system were a successful combination. However, the LTE system was unsustainable in an economic slowdown.

Today, there is a lot of speculation about the disintegration of the LTE system, but no conclusive explanation as to why and how this system turned out to be a burden. This analysis helps to answer these questions by showing increases in the costs of LTE are due to a disparity between the system and the economic environment. This disparity results in an increase in the AET level in companies, which leads to higher costs from maintaining employment security, higher wages for promoted workers, decreased employees' performance because of job security, low flexibility and difficulty maintaining the SBP.

Evidence suggests that the LTE system interfaces with the internal and external environment of the company to fulfill its functional prerequisites. Under LTE contracts, as employees remain with the same company, the AET level increases gradually. Other factors such as the presence of unions and the rapid aging of Japanese society also contribute to the increase in AET levels. A crucial factor that can keep the AET from increasing is rapid expansion of companies, as the addition of a sufficient new employees helps to minimize the overall AET level in a company. In the opposite case of a reduction in hiring, the increasing AET of existing employees is not offset by new hires, and the overall AET starts increasing rapidly. Consequently, a slowdown in the economy and decrease in demand of labor increases the AET level in a company.

This analysis contributes to the literature by defining the increase in the AET level as a representative index for the disparity between the economic environment and the LTE structure. Increases in the AET level indicate increases in the costs of the LTE structure. A higher AET level reflects the cost of additional payments to promoted workers, as well as increasing the intensity of other negative aspects of the LTE structure. On the other hand, the cost of maintaining employment security, which increases substantially with higher AET levels, becomes evident with a decrease in labor demand. This implies that negative aspects of LTE may be increased by a variety of factors in the internal and external environment, but they can be represented by an increase in the AET level of a company.

The negative effect of a higher AET on profitability is inline with Kandel and Pearson (2001), who state that future costs associated with an LTE system are not visible when it is adopted, but become evident with the passage of time. These costs can

suddenly become visible when labor demand declines. The findings are also compatible with the predictions of Sullivan and Pearson (1991), that adverse changes in the business environment can make it difficult for the LTE system to fulfill its functional prerequisites.

Supporters of LTE (see, e.g., Ouchi, 1981; Fujiwara, 1989) have noted the advantages of employee commitment, loyalty and mutual empathy to create a motivated workforce. We suggest that these benefits are possible only during times of high growth, when companies can maintain the SBP, and in return, employees can show loyalty, willingness to work, and tie their fate to the company's progress. When demand for labor declines, the difficulty of maintaining SBP can create frustration among employees and minimize the aforementioned advantages. Additionally, with the rapid changes in markets and technology, the ability of a company to alter the number of employees working on its behalf is crucial for a company's competitiveness.

Similarly, some studies (e.g., Peters and Waterman, 1982; Sethi et al., 1984; Freeman and Rebeck, 1989) present the positive effects of LTE as greater than the costs of the system. However, findings suggest that the composition of advantages and costs is not static—it changes over time with variations in the business environment. In the early years of an LTE program, when the AET level in a company is not very high, the costs are not visible. However, as the AET level increases, the cost of wages increases, and at an increasing rate. Therefore, the costs of LTE become more evident in the subsequent years of implementation. This is in agreement with Hashimoto and Raisian's (1985) concept of steeper earning–tenure profiles in lifetime employees. Regular additions of new employees can keep the AET level from growing, but the system becomes more sensitive to changes in the economic environment when proportion of long-tenured

employees increases in the company. The positive effects of LTE depend upon how much the internal and external environments are supporting the system. In an adverse environment, increases in costs of LTE can exceed its positive effects, producing a net negative value of the LTE program for a company.

Findings of this analysis have implications for Japanese companies. While it is not easy to quickly offset the costs created by the disparity of LTE with the current economic environment, a performance-based system can be the first step towards a solution. With a performance-based system, companies can gradually get rid of additional payment to the promoted workers. It can also make it possible to eliminate the jam-effect created by a large number of senior employees waiting for promotion based on seniority. Traditionally in Japan, the employer and employee are in what might be described as a parent-child relationship, where employer protect the employee from outside competition by providing the job security and employee remains loyal to the single employer. However, as argued by Waterman et al. (1994), a results- and achievement-oriented style, more of an adult-adult relationship between employer and employee, can translate into a positive impact on firm performance in the current economic environment. Though an LTE policy can produce competitive advantages of a company by investment in specific human capital, a key question faced by companies is to what extent they can adopt an LTE policy without being exposed to its negative consequences. There is a tradeoff between the benefits and costs of LTE, depending upon economic conditions.

With the long presence of the LTE system, the employment structure in Japanese companies has become externally rigid and internally flexible. However, external flexibility is crucial when there are fluctuations in demand. The use of subcontractors

(which Japanese firms have long done) can play an important role in providing Japanese companies with external flexibility. With subcontractors, companies can utilize skilled workers without the obligations of a rigid organizational structure. A partial implementation of LTE policy may be another option to maintain the advantages and avoid drawbacks of the system. In this approach, LTE contracts could be retained for a limited group of core employees related to the basic operations of the company. This can help to minimize the costs of the LTE system without losing all the positive aspects.

2.8. Limitations

The present analysis has several limitations. First, the sample uses electronics companies in Japan. This industry has experienced a high growth rate due to rapid technological developments in last several decades. Due to these developments and international competition, the costs of LTE may appear more strongly in this sample. However, the electronics industry is a large sector in the Japanese economy, and in this respect, is representative of the average business. Second, several other factors (e.g., technology, brand image, target market, international exposure of firm, etc.) have a role in determining profitability of these companies, but could not be included in the model because these data were not available. Third, the analysis is limited to the period from 1999 to 2002, which may be subject to more variability than a longer period would be. Fourth, age data are available only in terms of years, rather than exact age in months or days.

The model demonstrates the relationship of corporate profitability to the long-term presence of LTE policies. However, it is expected that future research in this

area can add alternative logics of organizational rationality. As it is noted, this analysis was within the special context of the historical presence of LTE in Japan. Critics may describe the theoretical basis of this analysis as being fragmented, as it includes such a wide variety of historical perspectives to determine the effect of LTE on corporate profitability. However, the purpose of adopting such a strategy is to use a broad selection of perspectives to add strength to the model.

Chapter-three

*Beginning of stock option based
compensation in Japan: a test of
alternative theories*

3.1. Introduction

In 1997, amendments in the commercial code of Japan made it possible for companies to use stock options as compensation for executives and employees. Further amendments in November, 2001 eliminated the ceiling on the percentage of outstanding stocks that can be offered as stock options as well as limitations on who can receive stock options, making it easier to use the companies' shares as a compensation package. Restructurings of the traditional corporate governance model and lifetime employment system that started after the burst of the bubble economy, helped stock options to have roots in Japanese companies. Consequently, companies increasingly adopted stock options as a performance-based compensation system to gain a capital market orientation and ensure a commitment to the shareholders¹⁵. The increasing use of stock options as a part of compensation in Japan, presents a challenge to the economists, interested in the Japanese employment relations. However, there are only few studies dealing with the economic significance of the option-based compensation for executives and employees in the Japanese business environment.

Most of the previous literature explains the use of stock options as a tool to mitigate the agency problems based on the assumption that stock options can provide incentive for the managers to act in the best interest of shareholders (e.g., Jensen and Meckling, 1976; Demsetz and Lehn, 1985; Jensen, 1993). The use of stock options for the retention and sorting of potential employees, is also getting attention in the recent

¹⁵ Data from 'Daiwa Securities' shows an increasing use of stock options in the Japanese companies (see, Fig. 3.1).

literature (e.g., Lazear, 2004). The financial and ownership structure of a firm may also have a role in defining the decision to go for this type of compensation schemes (Lewellen et al., 1987; Clinch, 1991; Beatty and Zajac, 1994; Anderson et al., 2000). However, due to the variety of implications associated with the stock options, a comprehensive analysis of the motives and determinants of stock options is still lacking. We use agency theory, retention and sorting model, and the financial and ownership structure of a firm to explain different aspects of stock options with reference to the Japanese business environment. By doing so, we are able to determine the difference in the motives of employee stock options and executive stock options, and redefine the role of risk and cash flow constraints in the decision to go for option-based compensation.

According to the agency theory, the use of stock options can provide an alternative mechanism of controlling, when direct monitoring is difficult (Holmstrom, 1979; Jensen and Murphy, 1990). Thus, the complexity in monitoring the large and diversified firms may lead towards the use of stock options. Similarly, theoretical models suggest the use of option grants to provide an incentive when the unobservable managerial efforts have a greater effect on the firm's value (Milgrom and Roberts, 1992; Gaver and Gaver, 1993; Guay, 1999; Himmelberg et al., 1999). Following these arguments, we explain the use of stock options when the set of growth options is larger for the firms. However, agency theory may hold better for the top executives that are actually involved in the decision making process, but may not hold completely for the lower level employees that can have a little direct impact on the firm's value. Agency theory can partially support the employee stock options with the justification that employees may feel peer-pressure and mutual monitoring that can increase the collective

efforts to enhance the value of a firm (Kandel and Lazear, 1992). However, this leads to the prediction that there must be some additional explanation for employee stock options.

In this regard, the retention and sorting of employees are two potential benefits of stock options that are increasingly gaining interest in the literature. Stock options can motivate employees to remain with the firm because employees in general are required to exercise their options before they leave the company (Hale, 1998). Retention of potential employees is of great interest in the Japanese business environment where the traditional LTE system is in a state of flux. Consequently, companies in Japan may adopt stock options as a retention mechanism to save their investments in the specific human capital. Retention of the key employees is critical when the human capital has a greater role for the value creation or when the firm has considerable growth opportunities related to the employees. According to Oyer and Schaefer (2005) the firms having close competition for the same set of workers are more concerned about losing their potential employees to the competitors. Therefore, such firms are likely to use stock options for the retention purpose.

The grant of options also adds a degree of risk in the compensation by tying the worth of payment with the value of a firm. An increase in the risk can reduce the incentive level of equity-based compensation because of the inability of managers and employees to hedge this risk (Aggarwal and Samwick, 1999; Jin, 2002). This may lead to a lower use of option-based compensation when risk level is high. On the other hand, a higher risk increases the chances of attracting the less risk-averse and optimistic employees to work at the firm. Thus, the motives of sorting and attraction of optimistic employees support a greater use of stock options when the risk level is high. Similarly,

when there is a greater variance in the potential employees' beliefs about the future returns of the firm, the option-based compensation will be more attractive for the optimistic employees or for the employees having the abilities and skill to increase the value of a firm. Therefore, in such cases, the use of stock options can help to attract the most suitable employees to work at the firm.

Previous literature explains the use of stock options to overcome the cash flow constraints (Lewellen et al., 1987; Clinch, 1991; Core and Guay, 1999, 2001; Anderson et al., 2000). On the contrary, the cost of issuing stock options for the company can be higher than its value perceived by the employees and managers¹⁶. Thus, the use of stock options as a substitute of cash payment may involve some justification other than just cash flow constraints. The alternative logic is explainable with the help of sorting motives of using stock options. A company can get the advantage of using stock options instead of cash payment, when it is able to attract the optimistic employees who can value the options greater than the market value. Thus, the substitute use of stock options is better explainable with the help of sorting considerations.

The interest and capability of ownership structure to monitor the firm, can also define the decision to go for option-based compensation. The presence of big shareholders can provide an alternative mean of monitoring the firm. Thus, a concentration of ownership may reduce the use of stock options. However, the institutional owners are likely to favor the market-based information to monitor the firm's performance and thus prefer to use stock options.

This analysis contributes to the research literature in several ways. First, it

¹⁶ Because of the risk associated with the stock options, managers and employees may value the options less than the market value (see, for instance, Barron and Weddel, 2003).

explores the issue, largely ignored in the research literature that why firms use stock options for employees when agency theory is not able to explain it completely. We use the retention and sorting motives to explain this form of compensation for employees. In this way, the findings are able to explain the difference in the determinants of the employee stock options and the executive stock options.

Second, it addresses the controversies in the research literature about the role of risk and cash flow constraints in defining the use of stock options. We redefine the role of risk and cash flow constraints with the help of sorting model.

Third, the findings of this analysis have important implications for the Japanese companies. The unique characteristics of the Japanese business environment and requirements of companies after the burst of bubble economy can help to explain the use of stock options for a variety of motives and expectations. These explanations can add new insights about the potential benefits and determinants of stock options

The remainder of this chapter is organized as follows. Section two presents the literature review and hypothesis development. Section three describes the variable definitions. Section four explains the empirical specifications. Section five presents data source and sample characteristics. Section six shows the descriptive statistic. Section seven discusses the results of regression analysis. Section eight concludes this chapter and describes the implications of research findings.

3.2. Literature review and hypothesis development

According to the economist model of human behavior the executive compensation implicitly or explicitly requires that executives should have equity incentives to perform

optimally (Jensen and Meckling, 1976; Demsetz and Lehn, 1985). However, for non-executive employees, it is less clear whether firms use stock options for incentive purposes (Core and Guay, 2001). This is because; lower level employees can have comparatively smaller influence on the stock price by their individual actions. On the other hand, the option grants add a degree of risk in the compensation by tying the worth of payment with the value of a firm. To counterbalance this risk, there must be some economic justifications to use this form of payment for an optimal employment contract. This chapter considers the potential economic justifications to explain the use of stock options as compensation. It focuses on three different theories to explain the rationale of increasing use of stock options in the Japanese companies. First, according to the agency theory, the option-based compensation can provide an alternative monitoring mechanism and an incentive for better firm performance by aligning the interests of management with that of shareholders. Second, according to the retention and sorting model, the vested exercise period associated with the option grants can help to retain the talented employees in the absence of traditional LTE system. In addition, the risk associated with the stock options can help to attract appropriate type of employees, such as less risk-averse employees or the employees having abilities and skills to increase the firm value. Third, the ownership and capital structure of the company may also have implications to go for stock options rather than cash compensation.

It is important to note that these three theories are not mutually exclusive as they ultimately lead towards the greater symmetry between the interests and requirements of the owners and management/employees. However, the implications of these theories can be different depending on the requirements of the companies. We try to calibrate these

theories according to the Japanese business environment and provide the implications of each for the Japanese companies. These aspects are presented in detail as follows.

3.2.1. Agency theory

Agency theory suggests that it is the principle's 'ability to observe the agent's performance' that determines the form of compensation. When accounting indicators can reflect reliable information about the manager's efforts, the appropriate form of contract is to pay a fix salary and penalize for suboptimal performance. However, if the appropriate actions are not 'observable', then tying the compensation with the firm's value can induce the employee to behave optimally (Holmstrom, 1979). Similarly, Jensen (1993) argues that equity incentives can mitigate the agency problems when the separation of ownership and control cause the self-interested managers to act in the ways not beneficial to the shareholders. The main prediction of the agency model describes that design of executive compensation should be able to align the interests of management with the interests of shareholders and thereby induce managers to exert efforts to increase the firm value (Holmstrom and Milgrom, 1987).

Our first five hypotheses are based on the agency theory to explain the use of stock options in Japanese companies. Demsetz and Lehn (1985) suggest that firms may go for option-based compensation when direct monitoring is difficult (costly). Thus, it is reasonable to propose that a higher monitoring cost of business increases the probability of using stock options. The monitoring cost is an inverse function of capital to sales ratio of a company. Therefore, our first hypothesis is as follows:

Hypothesis: H-3.1: Firms with a lower capital to sale ratio are more likely to use

stock options.

Large firms are difficult to monitor (Baker and Hall, 1998; Himmelberg et al., 1999; Core and Guey, 1998). Stock options can create mutual monitoring and peer-pressure to create the economies of scale in monitoring. This implies a greater use of stock options in the large firms, both for executives and for employees. However, in case of employee stock options, a single employee can have a comparatively smaller role in contributing the total value of a large firm. In other words, employee stock options can produce greater incentive in the smaller firms as compared to the larger firms. This leads towards the following hypothesis:

Hypothesis: H-3.2: The size of firm affects the likelihood of using stock options but the direction of relationship is to be asserted.

Therefore, the effect of firm size on the use of stock options can be positive or negative. Result of this hypothesis may help to define the preferences of the Japanese companies about using stock options with reference to their size.

Previous work on the diversifications of firms shows a negative effect of diversification on the value of a firm, which some said a 'diversification discount'. A dominant part of diversification discount is caused by an increase in the agency cost in a diversified structure (Lamont and Polk, 2001). This in turn can be explained by the fact that observing the performance is difficult in the diversified firms. Option grants can help to provide an alternative monitoring mechanism for such firms. Hence, it is plausible to hypothesize as follows:

Hypothesis: H-3.3: Diversified firms are more likely to use stock options.

When firms have low growth, the implications of employees' efforts are generally

related to the maintenance of assets. However, the firms with high growth opportunities tend to have more concerns about the efforts of employees to attain the benefits of these opportunities (Milgrom and Robert, 1992). Aligning the interests of employees with the shareholders is crucial to get better performance in case of higher growth opportunities. Moreover, direct monitoring is difficult when a large part of the firm's value is acquired by utilizing the growth options (Demsetz and Lehn, 1985; Jensen and Meckling, 1992; Smith and Watts, 1992). Thus, the firms with greater growth opportunities are expected to use stock options to capitalize their employees' efforts on these growth opportunities. We include two measures of the growth opportunities of a firm. First, from the point of view of a firm, it is reflected by the research and development (R&D ratio) expense of a firm. Second, from the point of view of market, it is presented by the value of Tobin's Q. Preceding discussion is summarized into the following two hypotheses:

Hypothesis: H-3.4: Firms with a higher R&D expense are more likely to use stock options.

Hypothesis: H-3.5: Firms with a higher Tobin's Q value are more likely to use stock options.

3.2.2. Retention and sorting

While it is true that stock option compensation is mainly understandable as a mechanism aligning the interests of managers with the interests of shareholders, the underlying consideration behind this explanation is the ability of top executives to affect the value of a firm by their individual actions. For the employees however, it is difficult to explain the option-based compensation only with the agency theory. This is because;

lower level employees can have a limited ability to affect the firm's value by their individual actions¹⁷. This insufficient explanation of employees' stock options with the agency theory, leads towards two potential benefits of stock options in the form of retention and sorting of employees. As the employees are forced to the early suboptimal exercise of their options, the vested exercise period can help to retain the employees (Hale, 1998). Similarly, the risk associated with the option grants can help to attract the most suitable employees to work at the firm. These include less risk-averse and more optimistic employees or the employees having abilities and skills to increase the value of a firm.

Though the use of stock options for retention and sorting purposes has received less attention in the previous literature, these motives are important to explain the use of stock options in the Japanese business environment. Long-term employment contracts in Japanese companies have been discussed frequently in research literature. Traditionally, Japanese companies have been putting special emphasis on the development of specific human capital by investing on the training and education of employees under the LTE contracts.

However, since last one decade, the difficulty to maintain the traditional employment structure has exposed the companies to a risk of losing their investment in the specific human capital. Other things being equal, the increasing use of stock options in Japanese companies is explainable as an effort to retain the valuable employees. Firms

¹⁷ With the grant of stock options, employees can show commitment and devotion to their duties and responsibilities in their specific area of work to make it valuable for the company's progress, but direct effect of their individual actions on the overall value of the firm remains minimal (See, e.g., Core and Guay, 2001).

need long-term employment contracts to encourage potential managers remain with the firm and make decisions that can increase continuing performance (Fudenberg et al., 1990; Kole, 1997). Retention of key employees becomes more important when employees can take with them some special information, knowledge, or skills that can be used by the competitors. Firms also tend to retain employees in the face of high cost of turnover, which includes the costs of re-hiring, training a replacement and lost productivity (Carter and Lynch, 2004). This problem is evident when the cost of changing the job is lower for the employees. However, since employees are forced to suboptimal early exercise of their options in case of departure from the firm, the use of stock options can help to balance the cost of turnover for the company with the cost of changing job for the employee.

In this perspective, an important question is that any form of compensation, a part of which is lost in case employees leave the firm can help with the retention. One way of doing this can be deferred cash payment. However, stock options can help to maintain the aggregate incentive level for the employees in the face of changing labor market conditions (Kadia and Mazumdar, 2002). Similarly, the option grants can help to load the risk on the employees as well as giving them chances of getting maximum benefits (Oyer and Schaefer, 2005). Moreover, if labor market conditions change, the deferred cash payment can become insufficient for employees or expensive for the firm, but stock options can act as a substitute of deferred payment when labor market conditions are positively correlated with the firm's stock price.

Preceding discussion leads towards next five hypotheses about the use of stock options for retention and sorting motives. When firms have considerable intangible assets

and growth opportunities, the retention of key employees becomes critical for the value creation. The benefits of growth opportunities depend on the availability of potential employees in the company (Smith and Watts, 1992). While growth opportunities increase the likelihood of using stock options to align the interests of shareholders with the employees, if the growth opportunities are greatly related to the human capital, the use of stock options may also reflect the purpose of retaining the potential employees (Core and Qian, 2000). Thus, it is reasonable to hypothesize as below:

Hypothesis: H-3.6: Firms with a higher value of “growth opportunities per employee” are more likely to use stock options.

Similarly, when human capital has a vital role for the value creation and the firm has substantial investments on the development of firm-specific skills of employees, the retention of these skilled employees is important for the firm. A higher wage level (wages per employee) in a company can indicate the importance of the human capital and thereby an increase in the likelihood of using stock options for the retention purpose. However, firms may also grant options to compensate the lower wage level in the company. In that case, the firms with a lower wage level may go for stock based compensation. This leads towards following hypothesis:

Hypothesis: H-3.7: The wage level in firm affects the likelihood of using stock options but the direction of relationship is to be asserted.

Therefore, the expected sign of wage level to define the use of stock options can be negative or positive. The result of this hypothesis may reflect the expectations of the Japanese companies in using stock options instead of cash payment.

As discussed earlier, the concerns of losing the talented employees to the

competitors are expected to increase, when firms have a close competition. Such firms are likely to use stock options to retain their key employees who can take with them some special skill or know-how that can be used by the competitors. Oyer and Schaefer (2005) suggest that the firms with stock returns close to the industry returns are likely to compete for the same set of workers. Following this proposition, we suggest a greater use of stock options in the firms competing for the same set of workers. Thus, it is plausible to hypothesize as follows:

Hypothesis: H-3.8: Firms having stock returns close to the industry returns are more likely to use stock options.

Stock options also add a degree of risk in the compensation by tying the pay with the worth of a company. The risk associated with the option grants is explainable in two ways. On the one hand, literature on the valuation of stock options suggests that the managers having their human capital tied with the fate of the firm are less willing to increase the uncertainty by adding risk to their financial capital in the form of stock options¹⁸. Thus, from the firm's perspective, though the value of stock options is an increasing function of risk, the value of stock options perceived by the managers can be different (less) from the actual cost to the firm (Lambert et al., 1991; Muelbroek, 2001). An increase in the risk level may enhance this difference in valuation (Aggarwal and Samwick, 1999; Jin, 2002). This implies that the increase in the risk may reduce the incentive level of stock options and makes it less likely to use stock options.

On the other hand, due to the risk associated with the stock options, different

¹⁸Managers risk their human capital with the firm performance because, future demand and job-opportunities for them are greatly related to the success and achievements of existing firm (see for details, Carpenter, 1998).

employees may value the options differently. It may be more attractive for the less risk-averse employees, or for the employees having skills and abilities to take actions that can result in the improvement of firm value (Lazear, 2004). These employees may also enhance the value of options by using insider information (Huddart and Lang, 2003). Consequently, the option grants can help to make the compensation more attractive for a certain group of employees. Following this, Ittner et al. (2002) suggest that stock options can play a screening role to attract right type of employees to work at the firm. Similarly, Oyer and Schaefer (2005) argue that option grants can help to attract more optimistic workers that are willing to invest in the firm's specific human capital by hard working and to be more productive. This implies that the increase in the risk level may help to use stock options for sorting purpose. According to preceding discussion following is plausible to hypothesize:

Hypothesis: H-3.9: The risk associated with the company stock affects the likelihood of using stock options but the direction of relationship is to be asserted.

The incentive model and the sorting model give opposite signs for the role of risk in defining the use of stock options. The results of this hypothesis may help to define the preferences of Japanese firms to use option grants for the incentive purpose or for the sorting and attraction purpose.

Similarly, when employees differ considerably about the future returns of a firm, it is possible to attract somewhat optimistic employees by using stock options. While large investments by the firm demonstrate higher growth expectations, the potential employees may vary considerably about the future value of these investments. Due to this variation, the option grants can be more attractive for a certain group of employees.

Hypothesis: H-3.10: Firms with a higher investment to capital ratio are more likely to use stock options.

3.2.3 Financial and ownership structure

As stock options do not need cash payment, companies with cash flow constraints may use stock options as a substitute of cash payment (Matsunga et al., 1992; Yermack, 1995; Core and Guey, 1999; Dechow et al., 1996). Similarly, the companies with higher capital needs or facing a higher cost of accessing the capital markets may use equity compensation for employees¹⁹. Therefore, it is plausible to hypothesize as below:

Hypothesis: H-3.11: Firms facing cash flow constraints are more likely to use stock options.

However, the use of stock options as a substitute of cash payment can be an expensive source of capital financing when incentive level of such compensation is considerably low because of the ‘deadweight loss’ associated with it²⁰. Therefore, a company may have a disadvantage in using stock options for financing needs, rather than accessing outside investors. To resolve these contrary arguments, we associate the use of stock options as a substitute of cash payment with the sorting model. The risk associated with the stock options implies the variance in the potential employees’ beliefs about the

¹⁹ According to Core and Guay (2001), as the information asymmetry is lower between the firm and its employees than between the firm and the outside investors, the equity compensation can serve as an inexpensive device as compare to the costly outside equity financing.

²⁰ Studies on the risk associated with the equity incentives explain that due to the inability of hedging the risk, employees and managers may value the stock options less than its cost to the company. Thus, according to Meulbroek (2001), firm has to bear the difference in this valuation as a “deadweight loss” for the compensation package (also see, for details, Carpenter 1998, and Jin, 2002)

future returns of a firm. Some of the employees may be more optimistic about the returns of firm than the others. Thus, firm can get a compensation discount on the wage payments by attracting less risk-averse and more optimistic employees. In this way, stock options can become an efficient form of equity financing if company can attract the optimistic employees that can value the options greater than outside investors. Therefore, it is expected that the sorting considerations have an important role to define the use of stock options as a substitute of cash payment. However, cash flow constraints may not be a necessary condition for the sorting motives.

A higher leverage indicates a higher risk associated with the firm. Thus, it can be expected that firms are less likely to increase the risk by granting options to induce managers for more risky decisions. Additionally, Jensen (1986) explains that disciplinary role of debt can reduce the need of an alternative mechanism of monitoring in the form of equity grants. On the other hand, Mehran (1992) argues that adding risk to the compensation may help to align the risk preferences of investors with the representative managers. Thus, according to this point of view firms with a greater leverage may be more inclined towards the use of stock options.

However, explaining the relationship of compensation policies and capital structure, John and John (1993) argue that the equity compensation would urge managers to pursue higher risk strategies to increase the value of equity and the creditors will demand more risk premium to provide capital. Consequently, the firms with higher leverage are less likely to use stock options. Depending on these two opposite views, the expected relationship of leverage with the use of stock options can be positive or negative.

Hypothesis: H-3.12: The level of leverage in firm affects the likelihood of using stock options but the direction of relationship is to be asserted.

The resultant sign of this hypothesis may help to explain the behavior of Japanese companies to go for stock options with reference to the level of leverage. The preference and ability of the shareholders to provide an alternative source of monitoring can help to explain the role of ownership structure in defining the use of stock options. Large shareholders are expected to have ability and interest to monitor firm (Hoskinsson and Turk, 1990). The presence of this alternative mechanism of monitoring may reduce the need of equity incentives.

Institutional owners are generally professional owners with specialized skills and know-how to organize the ways of monitoring (David et al., 1998). The grant of stock options can provide a better symmetry between the firm's performance and employees' effort. Thus, firms with a higher degree of institutional ownership are expected to use stock options to efficiently monitor firm. Preceding discussion suggest the following two hypotheses:

Hypothesis: H-3.13: Firms with a higher ownership concentration are less likely to using stock options.

Hypothesis: H-3.14: Firms with a higher degree of institutional ownership are more likely to use stock options.

Table 3.1 summarizes the hypotheses according to three different theories. The expected signs of these hypotheses are also presented in the last column of this table.

Table 3.1

Summary of hypotheses about the alternative theories concerning the use of stock options

| Descriptions | Hypotheses | Expected signs |
|---|---------------|----------------|
| <i>1-Agency theory</i> | | |
| Capital to sale ratio | <i>H-3.1</i> | - |
| Firm size | <i>H-3.2</i> | +/- |
| Diversification | <i>H-3.3</i> | + |
| R & D ratio | <i>H-3.4</i> | + |
| Firm's value (Tobin's Q) | <i>H-3.5</i> | + |
| <i>2-Retention & Sorting</i> | | |
| Growth opportunities per employee | <i>H-3.6</i> | + |
| Wages per employee | <i>H-3.7</i> | +/- |
| Competition | <i>H-3.8</i> | + |
| Risk | <i>H-3.9</i> | +/- |
| Investment to capital ratio | <i>H-3.10</i> | + |
| <i>3-Financial and Ownership structure</i> | | |
| Cash flow constraint | <i>H-3.11</i> | + |
| Leverage | <i>H-3.12</i> | +/- |
| Ownership concentration | <i>H-3.13</i> | - |
| Institutional owners | <i>H-3.14</i> | + |

3.3. Variable definitions

As discussed earlier, the previous literature proposes a number of potential justifications of option grants for executives and employees. We construct the analyses around these various aspects and drive the implications of each in the Japanese business environment.

A major difficulty in the available data is to define the employee stock option plans. Companies in Japan, often announce the number of managers and employees targeted in a stock option plan. Total number of option grants to these employees is also available. However, the number of option grants to each individual is not accessible. Within these limitations of available data, we take two considerations to define the employee stock option plans. First, Core and Guay (2001) define the employee stock options, when option grants are targeted towards the employees that are not among the top five executives of a company. Second, Oyer and Schaefer (2005) argue that a cut point of top five executives can overestimate the number of employee stock options, as in many firms, sixth or seventh top executive may also have a large number of option grants. Taking in view these two considerations, we classify the employee stock option plans, when the option grants are targeted towards at least 10 percent of the total number of employees, after excluding the top five executives of the company.

The descriptions of independent variables are based on the discussions in the previous section. First five independent variables hypothesize the use of stock options according to the agency theory. Capital to sale ratio is used as a proxy for the monitoring cost. It is presented as the amount of capital divided by the total sale of firm. It is denoted as *CAP_SAL*.

The log of total assets stands for the firm size. It is coded as *SIZE*. A dummy variable presents diversification. It takes the value one if company has more than fifty percent of sale in a single segment and zero otherwise. It is presented as *DIVERSIF*. We use two measures of growth opportunities. First, the research and development (R&D) expense scaled by the total assets of firm and second, the value of Tobin's Q (market value of the assets divided by the book value of the assets). These are denoted as *RD_RATIO* and *TOBIN_Q*, respectively.

Next five variables hypothesize the use of stock options based on the retention and sorting model. Following Core and Qian (2000), we use the growth opportunities per employee to proxy the role of human capital related to the growth options. It is calculated as the market value of equity minus book value of equity, divided by the total number of employees and coded as *GRO_EMP*. Firms also want to maintain the valuable employees when human capital is an important part of the value creation process. A higher wage level can indicate the worth of human capital in a company. The proxy of average wage of employees in a company presents this variable. It is calculated as the total wage expenses divided by the total number of employees in a company and presented as *WAG_EMPL*.

A strong competition between the firms may increase the likelihood of using stock options to retain the potential employees. Following Oyer and Schaefer (2005), 'the competition for the same set of workers' is presented by the proxy of relationship between the firm's stock returns and the industry returns. The firms having returns close to the industry returns are expected to have strong competition for the same set of workers. To create this variable, each firm's monthly stock returns are regressed on the

monthly stock returns of corresponding industry for a given year. *R*-square values from these regressions represent the proxy for this variable. The firms with a higher value of *R*-square are likely to use stock options for the retention of key employees. This variable is noted as *COMPITIN*.

Proxy of stock return volatility presents the risk associated with the firms' stocks. It is calculated as the standard deviation of the monthly stock returns of firm during the observation year and is denoted as *RISK*. Large investments present the greater variance in the potential employees' beliefs about the future value of these investments. The investment to capital ratio presents this variable. It is coded as *INV_CAPT*.

Finally, four variables explain the use of stock options based on the financial and ownership structure of a firm. The firms facing cash flow problems are unable to pay the dividends. It is a common measure used in previous research literature to define the cash flow constraints faced by firm. Following this, we present the cash flow constraints with a dummy variable having value one if firm does not pay any dividend in the observation year and zero otherwise. It is called cash flow constraint and denoted as *CASHCON*. The role of debt in defining the use of stock options is presented by the level of leverage in a company. Total debt divided by the totals assets of the company presents the leverage. *LEVERAGE* denotes this variable.

Ownership structure of a company may also explain the use of stock options. We use two measures of ownership structure of a firm. First, the concentration of ownership in the hands of big shareholders is an alternative mean of monitoring the firm. Therefore, the use of stock options is likely to reduce in the presence of large shareholders. Ownership concentration is presented as the total percentage ownership of top ten

shareholders. It is noted as *OWN_CON*. Second, institutional shareholders are expected to use market-based information to monitor firm. The percentage of institutional shareholders in the ownership structure defines this variable. It is denoted as *INST_OWN*.

3.4. Empirical specifications

In this chapter we use three different approaches to investigate the hypotheses. First, we analyze the characteristics of the firms using stock options. For this purpose, we describe the dependent variable as the “stock option plan in effect.” Second, we investigate the determinants and motives of stock option plan announcement. In this regard, we define the dependent variable as the “stock option plan announcement.” Third, we examine the motives of first time users of stock options. For this purpose, we use the dependent variable as “first time announcement of stock option plan.” In all three cases, initially we consider the executive stock option plans and then the employee stock option plans. These empirical specifications are discussed as follows.

3.4.1. Characteristics of the firms using stock options

In this part, we analyze the characteristics of the firms using option-based compensation. In this case the dependent variable is the stock option plan in effect. It takes the value one if the firm has at least one stock option plan in effect during the year T and zero otherwise. First, it considers the executive stock option plans in effect and then employee stock option plans in effect. These empirical specifications are presented in Eq.(1).

$$\begin{aligned}
 (\text{Executive plan in effect, Employee plan in effect})_T &= \beta_0 + \beta_1(\text{CAP_SAL})_{T-1} + \beta_2 \\
 (\text{SIZE})_{T-1} + \beta_3(\text{DIVERSIF})_{T-1} + \beta_4(\text{RD_RATIO})_{T-1} + \beta_5(\text{TOBIN_Q})_{T-1} + \beta_6 \\
 (\text{GRO_EMPL})_{T-1} + \beta_7(\text{WAGE_EMPL})_{T-1} + \beta_8(\text{COMPITIN})_{T-1} + \beta_9(\text{RISK})_{T-1} \\
 + \beta_{10}(\text{INV_CAPT})_{T-1} + \beta_{11}(\text{CASHCON})_{T-1} + \beta_{12}(\text{LEVERAGE})_{T-1} + \beta_{13} \\
 (\text{OWN_CON})_{T-1} + \beta_{14}(\text{INST_OWN})_{T-1} + \mathcal{E}, \quad \text{Eq.(1)}
 \end{aligned}$$

where β_0 is a constant, β_1 to β_{14} are the coefficients of different factors during the year 'T-1' and \mathcal{E} is the standard error factor.

3.4.2. Determinants of stock option plan announcement

This part analyzes the determinants of stock option plan announcement. The dependent variable takes the value one if firm announces a stock option plan in the year T and zero otherwise. Again, first it considers the executive option plans and then only employee stock option plans. These specifications are presented in Eq.(2).

$$\begin{aligned}
 (\text{Executive plan announcement, Employee plan announcement})_T &= \beta_0 + \beta_1 \\
 (\text{CAP_SAL})_{T-1} + \beta_2(\text{SIZE})_{T-1} + \beta_3(\text{DIVERSIF})_{T-1} + \beta_4(\text{RD_RATIO})_{T-1} + \beta_5 \\
 (\text{TOBIN_Q})_{T-1} + \beta_6(\text{GRO_EMPL})_{T-1} + \beta_7(\text{WAGE_EMPL})_{T-1} + \beta_8(\text{COMPITIN})_{T-1} + \\
 \beta_9(\text{RISK})_{T-1} + \beta_{10}(\text{INV_CAPT})_{T-1} + \beta_{11}(\text{CASHCON})_{T-1} + \beta_{12}(\text{LEVERAGE})_{T-1} + \beta_{13} \\
 (\text{OWN_CON})_{T-1} + \beta_{14}(\text{INST_OWN})_{T-1} + \mathcal{E}. \quad \text{Eq.(2)}
 \end{aligned}$$

3.4.3. Determinants of stock option plan adoption

First time users of stock options may have different motives. To investigate this, finally we examine the determinants of first time stock option plan adoption. In this part, the dependent variable takes the value one if firm announces a stock option plan for the first time during the year T and zero otherwise. Similar to the previous settings, first it considers the executive stock option plans and then only employee stock option plans. Eq.(3) defines these specifications.

$$\begin{aligned}
 (\text{Executive plan new announcement, Employee plan new announcement})_T &= \beta_0 + \beta_1 \\
 (\text{CAP_SAL})_{T-1} + \beta_2(\text{SIZE})_{T-1} + \beta_3(\text{DIVERSIF})_{T-1} + \beta_4(\text{RD_RATIO})_{T-1} + \beta_5 \\
 (\text{TOBIN_Q})_{T-1} + \beta_6(\text{GRO_EMPL})_{T-1} + \beta_7(\text{WAGE_EMPL})_{T-1} + \beta_8(\text{COMPITIN})_{T-1} \\
 + \beta_9(\text{RISK})_{T-1} + \beta_{10}(\text{INV_CAPT})_{T-1} + \beta_{11}(\text{CASHCON})_{T-1} + \beta_{12}(\text{LEVERAGE})_{T-1} \\
 + \beta_{13}(\text{OWN_CON})_{T-1} + \beta_{14}(\text{INST_OWN})_{T-1} + \mathcal{E}.
 \end{aligned}
 \tag{Eq.(3)}$$

3.5. Data sources and sample characteristics

We use the sample of 12,896 firm-year observations of the listed companies of Tokyo Stock Exchange (between 1997 and 2004). Data are obtained from three different sources. Data about the announcement of stock option plans are obtained from the website of Daiwa Securities²¹. This database presents all stock option plan

²¹ Information about the announcements of stock option plans in Japan, are available at (<http://www.daiwasmbc.co.jp/stock.html>).

announcements in Japan from 1997 to 2004. It gives information about the amount of options granted in an option plan, exercise price, the number of executives and employees targeted in an option plan, and the vested exercise period of stock options. Financial information is collected from 'Nikkei Economic Electronic Database System' (NEEDS). Information about the firm's annual stock returns, industry returns and annual dividend payment is collected from the 'Japan Securities Research Institute' (JSRI) CD-ROM database²².

Nevertheless, the use of stock options as a non-cash compensation is comparatively new in Japan, the number of firms using this type of compensation schemes has increased significantly. Figure 3.1 shows the use of stock options among Japanese companies in different years. There is an increasing tendency of using option-based compensation as we move 1997 to 2004.

Table 3.2 shows the year wise number of 'first time stock option plan announcements', 'total stock option plan announcements' and 'stock option plans in effect'. Executive stock option plans and employees stock options are presented in parallel columns. An increasing trend towards the use of stock options is evident both for executives and for employees. However, the number of new stock option plan announcements increase at a decreasing rate.

Among the 1,612 sample companies of Tokyo Stock Exchange 684 companies are using the stock option based compensation. Table 3.3 presents the number of option plan announcements by different firms, from 1997 to 2004. There are 928 non-adopting firms

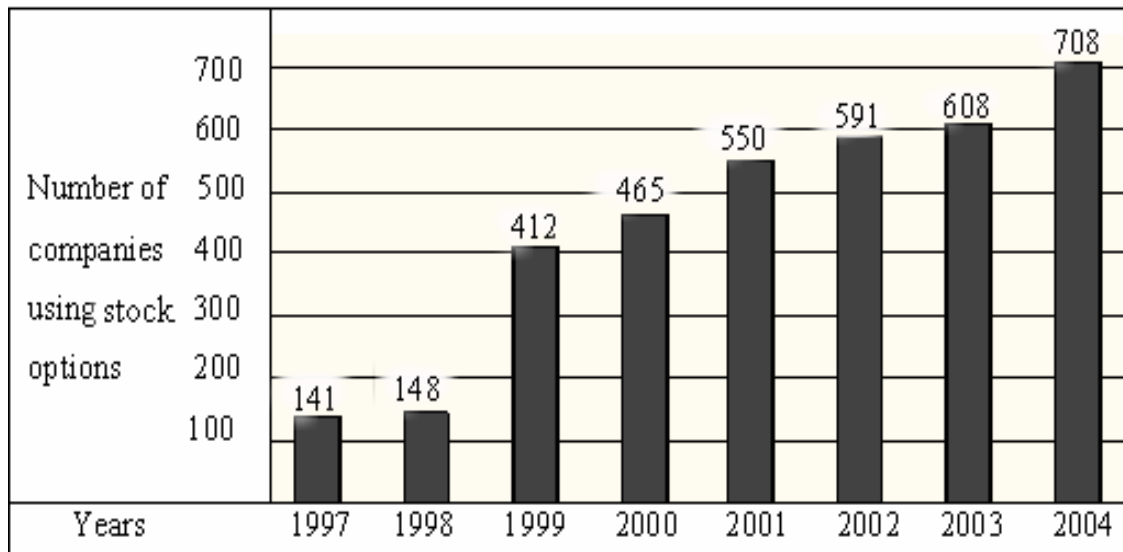
²² CD-ROM database 'Stock investment rate of return' is published every year by the 'Japan Securities Research Institute' (JSRI), (Information about the database are available at <http://www.jsri.or.jp/>).

in the sample. Among 684 adopting firms, the majority of firms have one option plan announcements, while 13 firms have 8 stock option plan announcements. The sample includes companies from 28 different industries.

Table 3.4 presents the option plan announcements in different industries. These figures are presented as a percentage of total stock option announcements in the subsequent column.

Figure 3.1

Number of companies using stock option based compensation in Japan, across different years.



Source: Data taken from 'Daiwa Securities'.

Table 3.2

Distribution of stock option plans across different years^a

| Year | Stock option plan | | Total Stock option plan | | Stock option plan | |
|------|--------------------------|----------------|-------------------------|----------------|-------------------|----------------|
| | first time announcements | | all announcements | | in effect | |
| | Executive plans | Employee plans | Executive plans | Employee plans | Executive plans | Employee plans |
| 1997 | 74 | 38 | 74 | 38 | 74 | 38 |
| 1998 | 47 | 25 | 74 | 34 | 121 | 63 |
| 1999 | 186 | 101 | 244 | 120 | 307 | 164 |
| 2000 | 109 | 71 | 261 | 131 | 410 | 228 |
| 2001 | 122 | 85 | 321 | 152 | 520 | 303 |
| 2002 | 84 | 78 | 338 | 154 | 586 | 383 |
| 2003 | 59 | 58 | 322 | 174 | 630 | 434 |
| 2004 | 56 | 42 | 304 | 160 | 684 | 470 |

^aTable displays the distribution across years of total 1,938 stock option plan announcements among the listed companies of Tokyo stock exchange. An option plan is categorized as employee stock option plan when it is targeted towards more than ten percent of the total number of employees, after excluding the five top executives of the company. First two columns show the first time option plan announcement events in different years. Total number of option plan announcements and the number option plans in effect during a given year is also shown in the subsequent columns.

Table 3.3Distribution of stock option plan announcements per firm^a

| Number of option plans | Number of firms | Percentage of total |
|------------------------|-----------------|---------------------|
| 1 | 215 | 31.43 |
| 2 | 151 | 22.07 |
| 3 | 95 | 14.03 |
| 4 | 84 | 12.42 |
| 5 | 55 | 8.04 |
| 6 | 48 | 7.16 |
| 7 | 19 | 2.92 |
| 8 | 13 | 1.90 |
| Total | 684 | 100 |

^a Number of option plan announcements among the 684 adopting firms between 1997 and 2004.

3.6. Descriptive statistics

Table 3.5 shows the mean, median and standard deviations of independent variables in the sample. In Table 3.6, the sample is divided into the “contracting sample” and “non-contracting sample.” A firm-year observation is included in the contracting sample if there is at least one stock option plan in effect during the observation year otherwise the observation is included in the non-contracting sample. Last two columns of Table 3.6 show the signs and *P*-values of *t*-test and *Wilcoxon*-test to examine the significant difference between the means of observed factors. By comparing two groups, several interesting observations can be made about the characteristics of the firms using stock options.

Firms in the contracting sample tend to be larger than the firms in non-contracting sample, which implies the use of stock options for the economies of scale in monitoring the large structure. Similarly, contracting sample contains the firms with a

Table 3.4

Option plan announcements across different industries between 1997 and 2004

| Industry name | Number of stock option plan announcements | Percentage of total announcements |
|---|--|--------------------------------------|
| Glass and ceramics | 23 | 1.18 |
| Rubber products | 2 | 0.10 |
| Services | 50 | 2.50 |
| Other products | 19 | 0.98 |
| Pulp and paper | 28 | 1.44 |
| Real estate | 51 | 2.63 |
| Warehousing and harbor transport services | 9 | 0.46 |
| Chemical sand pharmaceuticals | 135 | 6.96 |
| Wholesale and retail | 329 | 16.97 |
| Construction | 118 | 6.08 |
| Transportation and communication | 132 | 6.81 |
| Machinery | 198 | 10.26 |
| Fishery, agriculture and forestry | 1 | 0.05 |
| Marine transport | 20 | 1.03 |
| Oil and coal products | 20 | 1.03 |
| Air transport | 5 | 0.25 |
| Precision Instruments | 55 | 2.83 |
| Textile and apparel | 77 | 3.97 |
| Transport equipment | 85 | 4.38 |
| Metal products | 44 | 2.27 |
| Financial institutions | 35 | 1.80 |
| Steel products | 55 | 2.83 |
| Mining | 9 | 0.46 |
| Land transport | 43 | 2.21 |
| Electric power and gas | 27 | 1.39 |
| Electrical machinery | 142 | 7.33 |
| Nonferrous metal | 42 | 2.16 |
| Foods | 183 | 9.44 |
| Total | 1938 | 100 |

Table 3.5Summary of descriptive statistics of independent variables ^a

| Variable | Description | Mean | Median | Std. Dev. | Min. | Max. | Skewness |
|----------|---|-------|--------|-----------|--------|-------|----------|
| CAP_SAL | Capital to sale ratio | 0.71 | 0.60 | 0.43 | 0.04 | 1.12 | 0.26 |
| SIZE | Log of total assets | 10.17 | 10.58 | 2.03 | 3.09 | 16.20 | -0.16 |
| DIVERSIF | Diversification | 0.55 | 1.00 | 0.49 | 0.00 | 1.00 | -0.23 |
| RD_RATIO | R&D ratio | 0.08 | 0.07 | 0.06 | 0.00 | 0.18 | 0.14 |
| TOBIN_Q | Tobin's Q | 0.99 | 1.00 | 0.40 | 0.38 | 3.43 | 0.16 |
| GRO_EMPL | Growth opportunities per employee | -2.54 | -1.40 | 18.64 | -39.88 | 49.03 | 0.39 |
| WAG_EMP | Wages per employee | 5.49 | 5.39 | 1.34 | 2.11 | 17.39 | 0.10 |
| COMPITIN | Firm's returns compared to industry returns | 0.27 | 0.27 | 0.22 | 0.00 | 0.80 | 0.05 |
| RISK | Monthly stock return volatility | 10.73 | 9.88 | 5.14 | 2.48 | 36.56 | 0.03 |
| INV_CAPT | Investment to capital ratio | 0.60 | 0.47 | 0.48 | 0.06 | 1.65 | 0.68 |
| CASHCON | Cash flow constraint | 0.19 | 0.00 | 0.31 | 0.00 | 1.00 | 0.05 |
| LEVERAGE | Leverage | 3.50 | 2.28 | 4.32 | 1.09 | 7.09 | 0.02 |
| OWN_CON | Ownership concentration | 17.43 | 20.02 | 11.21 | 0.01 | 89.10 | 0.66 |
| INST_OWN | Institutional ownership | 0.26 | 0.24 | 1.36 | 0.00 | 10.92 | 0.89 |

^a The sample consists of 12,896 firm-year observations of the listed companies of Tokyo stock exchange (Between 1997 and 2004). Capital to sale ratio is the book value of capital divided by the total annual sale of a company. Log of the total assets represents the size of a company. Diversification is presented by a dummy variable taking value one if a company has more than fifty percent of sales in a single segment, and zero otherwise. Research and development (R&D) expense divided by the total assets defines the R&D ratio. Tobin's Q is the market value of assets (book value of liabilities + market value of equity) divided by the book value of assets. Growth opportunities per employee is the market value of equity minus book value of equity (in millions of yen), divided by the number of employees. Wages per employee is presented as the total wages expense (in millions of yen) divided by the number of employees in a firm. Competition is presented by the proxy of *R*-square values, obtained by running the regressions of monthly stock returns of each firm over the monthly stock returns of related industry during the observation year. A proxy of standard deviation of the monthly stock returns of a firm during the observation year defines the risk. Investment to capital ratio is the total investments during the year, divided by the book value of capital. Cash flow constrain is presented by a dummy variable taking value one if firm has no dividend payment during the observation year and zero otherwise. The total debt divided by the total assets presents the leverage. Ownership concentration is the percentage of shares held by the ten largest shareholders of a firm. Institutional ownership is the percentage of shares held by the institutional owners. To avoid the effects of outliers, all the continues variables are winsorized at the 1st- and 99th-percentiles

Table 3.6Descriptive statistics and test of significant difference between the contracting sample and non-contracting sample^a

| Variables | Mean | | Median | | Std. Dev. | | P-value | |
|-----------|--------------------|------------------------|--------------------|------------------------|--------------------|------------------------|----------------|-----------------------|
| | Contracting sample | Non-contracting sample | Contracting sample | Non-contracting sample | Contracting sample | Non-contracting sample | <i>t</i> -test | <i>Wilcoxon</i> -test |
| CAP_SAL | 0.71 | 0.71 | 0.56 | 0.61 | 0.54 | 0.40 | (-) 0.805 | 0.052 |
| SIZE | 11.31 | 9.90 | 11.15 | 10.44 | 1.47 | 2.05 | (+) 0.000 | 0.001 |
| DIVERSIF | 0.77 | 0.50 | 1.00 | 1.00 | 0.41 | 0.49 | (+) 0.000 | 0.019 |
| RD_RATIO | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | (+) 0.001 | 0.001 |
| TOBIN_Q | 1.09 | 0.96 | 1.00 | 1.00 | 0.57 | 0.35 | (+) 0.000 | 0.001 |
| GRO_EMPL | 1.92 | -3.63 | -0.42 | -1.67 | 21.18 | 17.80 | (+) 0.001 | 0.008 |
| WAG_EMP | 5.45 | 5.50 | 5.36 | 5.54 | 1.32 | 1.35 | (-) 0.295 | 0.075 |
| COMPITIN | 0.27 | 0.27 | 0.27 | 0.27 | 0.21 | 0.22 | (+) 0.953 | 0.272 |
| RISK | 11.12 | 10.63 | 9.93 | 9.87 | 5.83 | 4.94 | (+) 0.000 | 0.104 |
| INV_CAPT | 0.83 | 0.54 | 0.73 | 0.40 | 0.40 | 0.48 | (+) 0.018 | 0.001 |
| CASHCON | 0.10 | 0.21 | 0.00 | 0.00 | 0.31 | 0.41 | (-) 0.312 | 0.215 |
| LEVERAGE | 2.58 | 3.73 | 1.93 | 2.24 | 2.25 | 4.62 | (-) 0.001 | 0.003 |
| OWN_CON | 4.28 | 20.81 | 0.07 | 20.05 | 16.29 | 5.82 | (-) 0.001 | 0.021 |
| INST_OWN | 0.56 | 0.19 | 0.05 | 0.03 | 1.97 | 1.15 | (+) 0.001 | 0.002 |

^a Total sample consists of 12,896 firm-year observations of the listed companies of Tokyo stock exchange (Between 1997 and 2004). Table divides the sample in two groups: contracting sample and non-contracting sample. A firm-year observation is included in the contracting sample if there is at least one stock option plan in effect during the observation year otherwise the observation is included in the non-contracting sample. The last two columns report the signs and *P*-values of *t*-test and Wilcoxon test between the contracting sample and non-contracting sample (assuming the equality of means). To avoid the effects of outliers, all the continues variables are winsorized at the 1st- and 99th-percentiles

higher R&D ratio, and as expected, firms in this sample are higher valued, based on the Tobin's Q value. This is according to the proposition of using the stock options to capitalize the growth opportunities.

Similarly, in contracting sample, firms have higher growth opportunities per employee. This supports the prediction of using stock options for retention purpose when growth opportunities are related to the human capital. Contrary to the idea that higher risk may reduce the use of option grants, the firms with greater stock return volatility tend to be in the contracting sample. Similarly, firms in the contracting sample have a higher investment to capital ratio. This sustains with the idea of using stock options to attract the suitable employees to work at the firm. These observations indicate the use of stock options for the benefits other than just a monitoring mechanism. Firms have a higher leverage in the non-contracting sample. Similarly, the non-contracting sample includes the firms with greater ownership concentration. This is inline with the expectations that a monitoring structure in the form of big shareholders may reduce the use of stock options for monitoring purpose. However, a higher percentage of institutional owners in the contracting sample indicate the interest of institutional owners to use stock options as a market-based monitoring system. While the results of univariate analyses lend support to the hypothesized predictions, next section presents the multivariate analyses to analyze these aspects.

3.7. Regression analyses

We use binomial logistic regressions to investigate test our hypotheses. Correlation matrix and tolerance levels among the independent variables are presented in

Table 3.7. There are no signs of co-linearity and the tolerance level among the independent variables rejects the exclusion of any variable from the regression.

3.7.1. Characteristics of the firms using stock options

In this part, we use the estimating Eq.(1) to analyze the characteristics of the firms using stock options for executives and employees. The results of binomial logistic regressions are presented in Table 3.8. In panel A, the dependent variable takes the value one if there is at least one executive stock option plan in effect during the observation year and zero otherwise. In panel B, the dependent variable takes the value one if there is an employee stock option plan in effect during the observation year and zero otherwise.

Consistent with our hypothesis *H-3.1*, results indicate that the firms using stock options have higher monitoring cost in both panels. This explains the use of stock options to increase the efficiency of monitoring in case of executive stock option plans, and to get the economies of scale in monitoring in case of employee stock option plans. The results also indicate that large and diversified firms tend to use stock options both for executives and for employees. These results suggest a positive sign for hypothesis *H-3.2* and support the hypothesized prediction of *H-3.3*. For executives, these results are in accordance with the findings of Jensen and Meckling (1992) that explain the increase in monitoring difficulty with an increase in the size and diversification of a firm. For employee stock option plans however, the results show support to the suggestions of Kandel and Lazard (1992) that mutual monitoring and peer-pressure created by the option plans, can help to persuade employees of large and diversified firms to increase the firm's value, collectively. The results suggest an increase in the use of stock options with

Table 3.7

Co-linearity statistics and Pearson correlation matrix of independent variables

| Variable | Tolerance | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|-------------|-----------|---------|---------|--------|---------|--------|---------|-------|-------|--------|--------|--------|--------|--------|----|
| 1-CAP_SAL | 0.86 | 1 | | | | | | | | | | | | | |
| 2-SIZE | 0.88 | 0.02* | 1 | | | | | | | | | | | | |
| 3-DIVERSIF | 0.88 | -0.08** | 0.07** | 1 | | | | | | | | | | | |
| 4-RD_RATIO | 0.95 | 0.09** | 0.03 | 0.13 | 1 | | | | | | | | | | |
| 5-TOBIN_Q | 0.77 | -0.45** | -0.04 | 0.07* | 0.05* | 1 | | | | | | | | | |
| 6-GRO_EMPL | 0.67 | -0.13** | -0.07* | 0.09** | 0.08** | 0.37* | 1 | | | | | | | | |
| 7-WAG_EMP | 0.99 | 0.02* | -0.02* | -0.02* | -0.00 | 0.00 | 0.00 | 1 | | | | | | | |
| 8-COMPITIN | 0.99 | 0.02* | -0.02* | -0.00 | 0.00 | 0.03* | 0.02 | 0.00 | 1 | | | | | | |
| 9-RISK | 0.92 | -0.06* | 0.01* | -0.05* | 0.01 | 0.17** | 0.17** | 0.00 | 0.01 | 1 | | | | | |
| 10-INV_CAPT | 0.63 | -0.22** | -0.02* | 0.10* | -0.05* | 0.09** | 0.13** | -0.00 | -0.01 | 0.08** | 1 | | | | |
| 11-CASHCON | 0.78 | 0.11* | 0.07 | 0.15* | 0.03* | -0.06* | -0.14** | 0.00 | 0.01 | -0.17* | -0.27* | 1 | | | |
| 12-LEVERAGE | 0.67 | -0.26** | -0.17** | -0.06* | -0.13** | 0.02 | 0.03 | -0.00 | 0.00 | 0.09** | 0.54** | -0.29* | 1 | | |
| 13-OWN_CON | 0.75 | 0.02* | -0.24** | -0.15* | -0.07* | 0.02 | -0.11 | 0.01 | 0.00 | 0.02* | -0.16* | -0.07* | 0.05* | 1 | |
| 14-INST_OWN | 0.72 | 0.05* | -0.06* | 0.02 | -0.01 | 0.14** | 0.09** | 0.02 | 0.01 | 0.03* | 0.01 | 0.04 | -0.02* | 0.36** | 1 |

*significant at the 5 percent level; **significant at the 1 percent level

Table 3.8Characteristics of the firms using stock option plans (stock option plan in effect)^a

| Variable | Panel-A | Panel-B |
|----------------|-----------------------|-----------------------|
| Constant | -3.267*** (-5.61) | -5.901*** (-13.82) |
| CAP_SAL | -0.228* (-1.61) | 0.227** (2.63) |
| SIZE | 0.407*** (8.10) | 0.254*** (8.66) |
| DIVERSIF | 0.099 (0.97) | 0.421*** (4.95) |
| RD_RATIO | 5.714** (1.67) | 7.480*** (3.26) |
| TOBIN_Q | 0.168* (1.65) | 0.054 (0.57) |
| GRO_EMPL | 0.003 (0.71) | 0.013*** (4.58) |
| WAG_EMP | 0.007 (0.22) | -0.002 (-0.07) |
| COMPITIN | 0.285 (1.53) | 0.362** (2.13) |
| RISK | 0.061*** (5.85) | 0.047*** (7.07) |
| INV_CAPT | 1.172*** (9.20) | 1.250*** (10.86) |
| CASHCON | -0.033 (0.21) | 0.267** (-2.24) |
| LEVERAGE | -0.183*** (-4.98) | -0.174*** (-3.75) |
| OWN_CON | -0.320*** (-22.71) | -0.049*** (-9.85) |
| INST_OWN | 1.561*** (20.59) | 0.205*** (6.34) |
| Pseudo R^2 | 0.80 | 0.28 |
| Log likelihood | -1,103.53 | -2,583.16 |
| Chi- square | 812.27*** | 1,049.08*** |
| N | 12,896 | 12,896 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses report the Z-statistics computed on the bases of robust standard errors

^a The Sample consists of 12,896 firm-year observations between 1997 and 2004. The dependent variable is stock option plan in effect. In panel-A, the dependent variable takes value one if the firm has at least one executive stock option plan in effect a during the observation year and zero otherwise. In panel-B, the dependent variable is employee stock option plans (stock option plans that are targeted towards more then 10 percent of the employees after excluding the top five executives of the company). It takes the value one if the firm has at least one employee stock option plan in effect during the observation year and zero otherwise. All the independent variables are lagged one year. To avoid the effects of outliers, all continues variables are winsorized at the 1st- and 99th-percentiles.

an increase in the growth options of a firm both in terms of R&D ratio and in terms of Tobin's Q value. These are consistent with our hypothesis *H-3.4* and *H-3.5*. The use of equity incentives for executives and employees in greater growth opportunities is inline with the findings of previous studies in several ways. First, consistent with Smith and Watson (1992), valuable growth opportunities increases the need of aligning the interest of shareholders with the managers. Second, in case of high growth options, the accounting measures become insufficient to measure the performance (Lembert and Larcker, 1987). Third, stock options can reward managers and employees, over a multiple-years period in which the new projects are completed.

Results succeed quite well in predicting the use of stock options for retention and sorting purposes in Japanese companies. Though the greater growth opportunities increase the use of stock options both for executives and for employees, evidence suggests that employees are more likely to get stock options when the growth opportunities are strongly related to the human capital. This is inline with out hypothesis *H-3.6*. Hypothesis *H-3.7* gets positive sign in panel A and negative in panel B but remains insignificant in both panels.

Firms having stock returns close to the industry returns show more inclination towards the use of stock options. This supports hypothesis *H-3.8* and verifies the prediction that the firms competing for the same set of workers use stock options to attract and retain the key employees. Japanese companies are more concerned about the retention of their valuable employees, as they have been putting substantial amount of investments on the development of firm-specific skills of employees under the traditional LTE system. Retention of these employees is an important issue due to the lack of any

retention mechanism after the transitions in the traditional employment structure. Retention becomes more crucial when employees can take with them some special skill or expertise that can be used by the competitors. Thus, the increasing use of stock options in Japan is consistent to explain with the retention needs of the Japanese companies. In this regard, an important finding is the increases in the use of stock options with an increase in the stock return volatility. This is in contrast with the idea of a lower use of stock options in high risk conditions due to the reduced incentive level of options in high risk. On the other hand, this sustains with the proposition of using risk to attract the less risk-averse and optimistic employees to work at the firm.

Similarly, results show an increasing use of stock options when there is a greater variance in potential employees' believes based on large investments by the firm. This is also supportive to the hypothesized idea of using stock options to attract the right type of employees to work at the firm.

Results lend some support to the use of stock options for cash flow constraints but it is significant only in panel B. However, since the regressions in this part analyze the stock option plan in effect, the role of cash flow constraints may not be visible even if it would have been a consideration at the time of adopting the option plan. The effect of cash flow constraints on the decision to go for option-based compensation might be better translated when determinants of stock option plan announcement are analyzed in the next two parts. A related issue is the use of stock options with reference to the level of leverage in a company. Hypothesis *H-3.12* gets negative significant sign, which shows that firms with a greater leverage are lower user of stock options. This is in contrast with the view that use of stock options can bring the risk preferences of managers closer to the

representative investor (e.g., Mehran, 1992). However, this is accommodating the idea of Jensen (1993) that the disciplinary role of debt reduces the need of an alternative mechanism of monitoring.

Inline with the hypothesized prediction *H-3.13*, results indicate that the presence of big shareholders reduces the use of stock options. Though the monitoring cost is distributed among the shareholders, big shareholders are expected to be concerned about their part of monitoring cost. Due to this reason, big owners might be more interested to monitor the firm directly rather than using the option grants. Similarly, evidence confirms the hypothesis *H-3.14* that institutional shareholders prefer to use market-based measures to analyze the performance of managers and employees.

While comparing the outcomes of panels A and B, though the agency theory is supported in both panels, the results are more favorable for the sorting and retention model in case of employee stock option plans. The financial and ownership structure got consistent results in both cases to sustain with the hypothesized predictions. Moreover, as the underlying reason behind the considerations of financial and ownership structure, is the incentive effect of stock options, it is also confirming the results of agency theory.

In some cases results show mix support both for executive stock options and employee stock options. One reason for this is that it is not possible to completely distinguish the executive stock options from employee stock options with the available data. For instance when we consider the executive stock options in panel A, it also includes the cases of employee stock options, because when companies have employee stock options, generally they also have the executive stock options. The other possible reason of getting mix results is that three theories are not mutually exclusive, completely.

These are shared commonalities and ultimately lead towards better alignment between the owners and management/employees. However, the results are able to translate the preferences of the companies in adopting different approaches for executive stock options and employee stock options based on the implications of these theories.

3.7.2. Determinants of stock option plan announcement

The estimating Eq.(2) examines the determinants of stock option plan announcement in Japanese companies on the basis of three different theories presented earlier in this chapter. Table 3.9 shows the results of binomial logistic regressions. The dependent variable is the stock option plan announcement. In panels A and B, it takes the value one if firm announces an executive stock option plan during the observation year and zero otherwise. In panels C and D, the dependent variable takes the value one if the firm announces an employee stock option plan during the observation year and zero otherwise. Panels A and C present the main regression according to the estimating Eq.(2), while panels B and D include the interacting variables. In this part, we discuss the main regression results presented in panels A and C, while results of panels B and D are discussed later in this chapter.

The results of first three variables show support to the agency theory for the executive stock options, but these variables cannot get the significant level as a motive for employee stock options. This is in agreement with the findings of Core and Guey (1998) that stock options can help to induce managers to make decisions inline with the requirements of shareholders. However, as lower level employees can have a little direct influence on the decision making process, the incentive alignment considerations are

Table 3.9Determinants of stock option plan announcement (stock option plan announcement)^a

| Variable | Panel-A | Panel-B | Panel-C | Panel-D |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Constant | -3.508*** (-8.24) | -3.369*** (-7.61) | -1.093 (0.41) | -2.832*** (-6.11) |
| CAP_SAL | -0.119* (-1.37) | -0.116* (0.17) | 0.077 (0.80) | 0.094 (0.85) |
| SIZE | 0.283*** (9.15) | 0.283*** (8.59) | 0.035 (1.24) | 0.036 (1.27) |
| DIVERSIF | 0.299*** (3.11) | 0.301*** (3.12) | 0.083 (0.74) | 0.071 (0.63) |
| RD_RATIO | 6.962*** (2.42) | 6.95* (2.34) | 4.701** (1.45) | 4.150* (1.26) |
| TOBIN_Q | 0.12 (0.10) | 0.14 (0.10) | 0.30** (2.42) | 0.30*** (2.37) |
| GRO_EMPL | 0.004 (1.35) | 0.004 (1.33) | 0.005* (0.21) | 0.005* (0.24) |
| WAG_EMP | -0.030 (-0.01) | -0.031 (-0.01) | -0.013 (-0.40) | -0.011 (-0.34) |
| COMPITIN | -0.006 (-0.03) | -0.005 (-0.02) | 0.385** (1.93) | 0.398** (1.98) |
| RISK | 0.056** (7.25) | 0.033** (5.26) | 0.047*** (5.77) | 0.028** (6.39) |
| INV_CAPT | 0.355*** (2.80) | 0.357*** (2.91) | 0.591*** (4.57) | 0.590*** (4.52) |
| CASHCON | 0.263** (-1.93) | 0.391* (-0.98) | 0.151 (0.87) | 0.171* (0.259) |
| LEVERAGE | -0.108*** (-4.27) | -0.107*** (-3.13) | -0.128*** (-3.07) | -0.122*** (-3.03) |
| OWN_CON | -0.196*** (-20.71) | -0.197*** (-21.23) | -0.151*** (-13.24) | -0.151*** (-13.17) |
| INST_OWN | 0.993*** (18.96) | 0.994*** (19.09) | 0.767*** (15.12) | 0.767*** (15.08) |
| CASHCON × RISK | | 0.060*** (6.88) | | 0.052** (5.98) |
| Pseudo R ² | 0.50 | 0.59 | 0.31 | 0.32 |
| Log likelihood | -2,103.7 | -1,721.21 | -1,731.34 | -1,711.60 |
| Chi- square | 1,142.80*** | 711.25*** | 716.36*** | 735.24*** |
| N | 12,896 | 12,896 | 12,896 | 12,896 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses report the Z-statistics computed on the bases of robust standard errors

^a The Sample consists of 12,896 firm-year observations between 1997 and 2004. The dependent variable is announcement of a stock option plan. In panel A and B the dependent variable is defined for the executive stock option plans. It takes the value one if the firm announces a stock option plan in the observation year and zero otherwise. In panel C, and D, the dependent variable is the employee stock option plan (option plans that are targeted towards more than 10 percent of the employees after excluding the top five executives of the company). It takes the value one if the firm announces an employee stock option plan in the observation year and zero otherwise. All the independent variables are lagged one year. To avoid the effects of outliers, all continuous variables are winsorized at the 1st- and 99th-percentiles.

insufficient to explain the employee stock options. Results indicate that the greater growth opportunities lead towards the use of stock options both for executives and for employees. However, similar to the previous regressions, when growth opportunities are greatly related to the employees of a firm the results are significant only for employee stock option plans. This supports the hypothesis about the use of employee stock options for retention purpose to capitalize the growth opportunities with the help of valuable employees in the company.

Similarly, when firms are close competitors the results support the use of employee stock option plans. This is inline with the prediction of Oyer and Schaefer (2005) that firms use employee stock options for the retention purpose when they fear to lose the potential employees to the close competitors. Consistent with the previous regressions, an important finding is that a higher risk and greater investments lead towards the greater use of stock options both for executives and for employees. While a higher risk and large investments add a degree of uncertainty about the future outcomes of a firm, it can increase the chances of sorting and attraction of the right type of employees to work at the firm. Thus, the results are in contrast to the view of using stock options only for the incentive purpose. These results explain the preferences of Japanese companies to use stock options for sorting and retention of suitable employees to work at the firm.

Results lend a partial support to the relationship between the cash flow constraints and the likelihood of using stock options, which may complement partly with the use of stock options to overcome the cash flow shortage. However, this discards the use of stock options as a substitute of cash, exclusively for cash flow constraints. Moreover, as the

sorting considerations have got the consistent results, it holds with the proposition to relate the grant of stock options as a substitute of cash payment with the sorting model. This in turn can be explained that stock options serve as an inexpensive source of capital financing only when they are used to attract the optimistic employees to work at the firm. This issue is addressed in detail after the next part.

Consistent with the results of previous part, it is evident that disciplinary role of debt as an alternative mean of monitoring reduces the use of stock options. These results are also inline with the explanation of John and John (1993) which argues that a higher leverage with an option-based pay is not a successful combination, because in such cases, creditors demand more risk premium due to the chances of risky decisions by the managers. Inline with the expectations, results show a lower use of stock options in a higher degree of ownership concentration. One the other hand, the use of stock options increases with an increase in the institutional ownership.

While comparing the results of panels A and C, the results of this part translate a comparatively clearer difference in the motives of executive stock options and employee stock options. The agency theory gets greater support in case of executive stock options and only a limited support in case of employee stock options. On the other hand, the sorting and retention model gets better results in case of employee stock options and a partial support in case of executive stock options. Variables related to the financial and ownership structure get consistent results in both cases, except cash flow constraint that is not significant for employee stock option plans.

3.7.3. Determinants of stock option plan adoption

Estimating Eq.(3) investigates the motives of the first time stock option plan

adoption. Table 3.10 presents the results of binomial logistic regressions. The dependent variable is the first time stock option plan adoption. In panels A and B, it takes the value one if firm announces an executive stock option plan for the first time during the observation year and zero otherwise. In panels C and D, the dependent variable takes the value one if the firm announces an employee stock option plan for the first time during the observation year and zero otherwise.

Panels A and C of Table 3.10 present the main regression according to Eq.(3). In case of first time stock option plan adoption a higher monitoring cost (based on capital to sale ratio) turns out to be insignificant reason to go for stock options. However, size, diversification and growth opportunities sustain as important motives both for executive stock options and for employee stock options. Similar to the results of previous two parts, the greater growth opportunities related to the employees show support to go for employee stock option plans. Risk gets the predicted sign in case of executive stock options and gets the predicted sign as well as the significant level in case of employee stock options. This confirms the results of previous parts about preferences of Japanese companies to use stock options for sorting and retention of valuable employees.

Large investments lead towards the adoption of stock-based compensation both for executives and for employees. Cash flow constraints provide a partial support to adopt the employee stock option plans. Consistent to the previous parts, higher leverage and ownership concentration reduce the chances of using stock options while firms with a higher institutional ownership are likely to adopt the option-based compensation. While comparing the results of executive stock options and employee stock options, it is evident that first time adoption decision also involves the sorting and retention considerations in

Table 3.10Determinants of stock option plan adoption (new stock option plan announcement)^a

| Variable | Panel-A | Panel-B | Panel-C | Panel-D |
|----------------|-----------------------|----------------------|---------------------|----------------------|
| Constant | -4.387*** (-9.48) | -4.479*** (-8.29) | -5.33*** (-8.18) | -5.357*** (0.566) |
| CAP_SAL | 0.172 (1.67) | 0.170* (1.45) | -0.100 (1.97) | -0.102 (-0.59) |
| SIZE | 0.119*** (4.19) | 0.120*** (4.10) | 0.135*** (4.22) | 0.134*** (4.07) |
| DIVERSIF | 0.597*** (4.86) | 0.596*** (4.73) | 0.780*** (5.09) | 0.720*** (4.72) |
| RD_RATIO | 6.061*** (2.27) | 6.620*** (3.93) | 10.82*** (3.62) | 9.184*** (3.75) |
| TOBIN_Q | 0.203** (1.51) | 0.205 (0.70) | 0.121 (0.73) | 0.122 (0.73) |
| GRO_EMPL | 0.002 (0.68) | 0.002 (0.56) | 0.007* (1.75) | 0.006* (1.53) |
| WAG_EMP | -0.007 (-0.22) | -0.007 (-0.21) | -0.040 (-0.97) | -0.038 (-0.93) |
| COMPITIN | 0.433** (2.14) | 0.433** (2.14) | 0.292 (1.20) | 0.330* (1.37) |
| RISK | 0.008 (1.05) | 0.007 (0.56) | 0.016* (1.68) | 0.015* (1.57) |
| INV_CAPT | 0.757*** (4.50) | 0.575*** (4.32) | 1.120*** (7.25) | 1.126*** (6.65) |
| CASHCON | 0.107 (0.75) | 0.177* (0.10) | 0.247* (2.75) | 0.321** (5.24) |
| LEVERAGE | -0.098** (-2.33) | -0.099** (-2.21) | -0.161** (-2.22) | -0.198*** (-2.34) |
| OWN_CON | -0.068*** (-10.18) | -0.068** (-8.96) | -0.39*** (-4.71) | -0.039*** (-4.67) |
| INST_OWN | 0.277*** (7.21) | 0.277*** (6.54) | 0.192*** (4.12) | 0.202*** (4.29) |
| CASHCON × RISK | | 0.015 (0.52) | | 0.022* (1.21) |
| Pseudo R^2 | 0.15 | 0.16 | 0.14 | 0.15 |
| Log likelihood | -1,899.15 | -1,421.12 | -1,397.41 | -1,384.89 |
| Chi- square | 593.76*** | 554.21*** | 495.30*** | 502.03*** |
| N | 12,896 | 12,896 | 12,896 | 12,896 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses report the Z-statistics computed on the bases of robust standard errors

^a The Sample consists of 12,896 firm-year observations between 1997 and 2004. The dependent variable is first-time announcement of a stock option plan. In panel A and B the dependent variable defined for the executive stock option plans. It takes the value one if the firm announces an executive stock option plan for the first time in the observation year and zero otherwise. In panel C and D, the dependent variable is the employee stock option plan (stock option plan that is targeted towards more than 10 percent of the employees after excluding the top five executives of the company). It takes the value one if the firm announces an employee stock option plan for the first time in the observation year and zero otherwise. All the independent variables are lagged one year. To avoid the effects of outliers, all continuous variables are winsorized at the 1st- and 99th-percentiles.

case of employee stock options. However, the evidence suggests that firms give more weight to the incentive considerations when they decide to go for option-based compensation for the first time.

3.7.4. Cash flow constraints vs. sorting considerations

As discussed in the literature review, the use of stock options as a substitute of cash payment is better understandable with the help of sorting motives. Earlier regressions (panels A and B of Table 3.8, and panels A and C of Table 3.9 and 3.10) are able to provide a consistent support to the sorting model, especially when employee stock options are used to define the dependent variable. On the other hand, the use of stock options in case of the cash flow constraints cannot get a sustainable support in these regressions. These results may explain the rationale of using stock options as a substitute of cash for sorting purpose, even without cash flow constraints. However, it is important to investigate the two conditions simultaneously to see the preferences of Japanese companies about using these two approaches.

In addition, the use of stock options for cash flow constraints without the sorting considerations may be less attractive for the companies because of the reason that stock options can be an expensive source of financing without attracting less risk-averse and optimistic employees. Therefore, finally we analyze the use of stock options as a substitute of cash payment with the sorting considerations.

As a higher risk level presents the greater chances of sorting and attraction of the certain type of employees, it is appropriate to analyze the role of risk in case of cash flow constraints. Thus, we hypothesize that cash flow constraints with a high risk can make it

more favorable to use stock options, because of the greater chances of sorting and attraction of potential employees. For this purpose, the interaction of CASHCON and RISK is included in the regression. Panels B and D of Tables 3.9 and 3.10 show the results of the regressions with the interaction of variables. Though an increase in the risk level alone, leads towards the greater use of stock options, a higher risk with the cash flow constraints produce greater coefficient value than otherwise. This is inline with the prediction that companies consider the sorting motives when using stock options as a substitute of cash payment. However, it is difficult to differentiate these two conditions completely, as the measures for both are interrelated. While it is to acknowledge that there are limitations of defining these conditions with the available data, we do not present these two as necessary conditions for each other. Our analyses suggest that both risk and cash flow constraints can lead towards the option-based compensation in certain circumstances but the situation becomes more favorable for the use of stock options when these conditions happen together.

3.8. Conclusions and limitations

This chapter reveals several issues of compensation literature by examining the use of stock options in Japanese companies. Previous research provides the motives of option-based compensation predominantly based on agency theory. However, the findings of this analysis suggest that if the option grants to employees are not driven by the incentive reasons, then the choice of stock options over cash is best explained by the theories involving retention and sorting of employees. The vesting period of stock options can help to retain the potential employees and if some of the potential employees

are somewhat risk-tolerant, then the risk associated with the stock options can help for the sorting and attraction of such employees to get a compensation discount in the wage payments.

Overall the findings of this analysis are supportive for the agency theory in case of executive stock option plans while the retention and sorting model get more sustainable results in case of employee stock option plans. Financial and ownership structure support both the executive stock options and employee stock options with a consistency in expected signs in both cases. While it is evident that no single theory can explain the use of stock options exclusively, the results show partial support from different aspects to define the motives of the executive stock options and employee stock option plans. Agency theory succeeds fairly well in defining the executive stock options but the results cannot sustain with the agency theory as a principle motive to explain the employee stock options. Results are most consistent with the retention and sorting model when employee stock option plans are considered. Meanwhile, retention and sorting model also sustains in case of executive stock option plans.

An important finding is the greater use of stock options with an increase in the firm's stock return volatility. This is in contrast with the idea of a lower use of option grants in the high risk conditions. On the other hand, these findings suggest the sorting motives as an important reason to go for option-based compensation in Japanese companies. Similarly, evidence suggests that firms use stock options to attract the optimistic employees when there is greater variance in the potential employees' beliefs about the future returns of the firm. The findings indicate that firms can take the advantage of compensation discount on the wage payments by attracting optimistic

employees who may prefer the option grants to the equally costly cash payment. Thus, stock options can serve as a source of low cost capital financing by issuing shares to less risk-averse employees when firm has a difficulty in accessing the capital markets.

The use of stock options as a substitute of cash is not fully explainable with the incentive model presented in the previous studies. Findings of this analysis explain the substitute use of stock options against the cash payment with the sorting considerations. It is to acknowledge that the limitations of defining the substitute effect of stock options with the consideration of sorting motives, can doubt the results. However, the greater use of stock options for sorting purpose in case of cash flow constraints, sustain with the hypothesized prediction. These findings lend support to the prediction that use of stock options as a substitute of cash payment can be an optimal choice when there are greater chances of attracting the risk-tolerant and optimistic employees.

This analysis also has some limitations related to the available data of stock options in Japan. As the data about the number of stock option grants to a single executive or employee, is not accessible in Japan, it is difficult to completely distinguish the executive stock options and employee stock options. More detailed data may give a clearer picture of the determinants and motives of stock options. Similarly, we discuss the increasing use of stock options with reference to the unique institutional characteristics of Japanese business environment and requirements of companies after the burst of bubble economy. The findings may have limitations for the different business environments. A great deal of complexity associated with the use of stock options also limits examining it comprehensively. In this regard, the mutual exclusiveness of three theories is arguable as some time they can complement each other. However, we try to find out the parallel

justifications of these theories to distinguish the implications of each in the Japanese business environment.

Chapter-four

The performance impacts of option plans in Japan

4.1. Introduction

Japanese companies are increasingly adopting stock options since the amendments in the commercial code of Japan, in 1997. However, there are a lot of speculations about the performance impacts of such compensation plans. But only few studies address the question of how stock options are affecting the firm's performance in the unique Japanese business environment²³. Moreover, within the corporate governance literature and more specifically within the executive compensation literature, there are contrary views on the efficiency of option-based compensation. In this chapter, we try to examine whether the use of stock options helps to add economic value to firms in Japan or the results of stock options are overestimated.

Stock options and managerial equity incentives have been discussed in the theoretical literature with reference to the need of aligning the interests of management with the owners. Previous literature on these issues has generated not only useful insights, but also has produced many contradictory findings. Not surprisingly, many fundamental questions remain unanswered; among them is the performance impact of stock options. The incentive alignment idea of stock options is primarily based on the economist model of human behavior, which states that managers will not act optimally unless they are given some incentive to do so (Holmstrom, 1979). A number of researchers derive support for option grants in order to reduce this moral hazard that occurs because of the separation of ownership and control (Milgrom and Roberts, 1992; Gaver and Gaver, 1993; Core and Guey, 1998). Based on agency models, previous literature explains that equity grants as an incentive to align the interests of management with that of shareholders and

²³ Exceptions include Kato et al., (2005) and Ushida, (2005).

thus improve the firm's performance (Demsetz and Lehn, 1985; Milgrom and Robert, 1992; Guay, 1999). Option grants as a tool to reduce the monitoring cost and increase the profit margins, is also explained by previous studies (Baker et al., 1988; Hall and Liebman 1998; Himmelberg et al., 1999). An important benefit of stock options is to encourage managers to put extra efforts and take advantage of available growth opportunities.

Despite a large body of theoretical literature suggesting a positive effect of option grants on the firm's performance, empirical findings are divided on this issue. Some of them (e.g., Lambert and Larcker, 1987; Core and Guey, 2001; Kadia and Mazumdar, 2002 and Ittner et al., 2002) verify the positive effect of stock options on the firm's performance. While others, point to the hidden cost of options. For instance, Carpenter (1998) argues that managers may value the options less than its cost to the company. Yermack (1995) explains that the chances of reprising the options decreases the positive effects of option grants on the firm's performance. According to Aboody and Kasznik (2000), though stock options can be an ideal way of compensating the executives, generally stock options are not successful in motivating and providing incentives for the better performance, distribution of rewards, and often expansion for the shareholders²⁴.

Skeptics of the options also suggest that managers can manipulate the accounting results and information disclosure to increase their wealth at the cost of the long-term financial health of the firm, which may not be beneficial for the shareholders (Carpenter

²⁴ Similarly, Yermack (1997) argues that managers may select the investments that can increase the short-term stock price at the cost of intrinsic firm value.

and Remmers, 2001; Bens et al., 2002). Due to these controversies about the consequences of stock options, it is not only important but also necessary to examine the economic significance of option grants in the Japanese business environment. This analysis addresses these controversies by analyzing the empirical specifications between the stock option plan announcement and the firm performance in Japan. We follow the agency-theory framework as an organizing principle to see the efficiency of option grants for maximizing the net expected economic value for the shareholders. Most of the previous studies use a sample of US companies to analyze the efficiency of stock options²⁵. However, this may not provide sufficient implications for the Japanese business environment, where the corporate governance structure is undergoing transformations and the companies are struggling to find out a performance-based compensation system to replace the traditional employment structure.

This analysis is different from the previous studies in several ways. First, unlike previous studies (e.g., Lambert and Larcker, 1987; Aboody 1996; Rees and Stott, 1998; Core and Guey, 2001), we use multiple measures of firm performance to investigate how a firm's value changes after the announcement of option plan. Initially, the operating-performance measures such as the changes in number of employees, sales volume, operating income, net income, and return on asset ratio of firm are utilized. However, due to the favorable accounting treatment of options, the operating-performance measures can be biased²⁶. Therefore, finally the abnormal returns

²⁵ See, for instance, Yermack (1994), Mehran (1995), Kadia and Mazumdar (2002) and Ittner et al. (2002).

²⁶ Since stock options are not treated as expense, the operating-performance measures may show improvements when companies grant options rather than the cash compensation (See, for details, Crystal, 1991).

are used to examine the net economic value additions to the firm. We use the market adjusted returns of the company's stock to present the abnormal returns. Further, we also use the market adjusted returns related to the industry returns and related to the market-portfolio returns of the Tokyo Stock Exchange to eliminate the chances of results being affected by industry or market trends. The testable prediction of using the stock-market reactions implies that a positive market reaction to the announcement of an option plan may indicate the confidence of investors and shareholders about option grants as a useful tool to increase the firm's value.

Second, we try to examine the behavior of management by analyzing the changes in board-member ownership and dividend policy after the announcement of an option plan. We use the most recent and long-term data, starting from the beginning of stock options in Japan (i.e., a cross sectional data of 12,896 firm-year observations of the companies listed on Tokyo Stock Exchange, between 1997 and 2004).

Third, while the use of stock options may increase the abnormal returns of a firm, it is important to analyze from where these performance gains are acquired. In this regard, first we investigate the association of option-grant intensity with performance gains, and then, try to analyze this relationship with reference to the economic determinants of granting options. We propose that the considerations of economic determinants such as high growth opportunities, risk and cash flow constraints can help to get maximum gains by granting options. The findings of this analysis may help to understand why some firms are able to use stock options better than others.

Fourth, as our analysis focuses the Japanese data, it has important implications for the Japanese companies. While discussing the use of stock options in the Japanese

companies there are two major considerations. On the one hand, as discussed in the previous chapter, the potential benefits of stock options match with the needs, requirements and expectations of Japanese companies after the burst of bubble economy. In this regard, the increasing use of stock options in Japan indicates that stock options are helping to improve firm's performance. Therefore, it is reasonable to hypothesize that stock options increase the performance gains in Japanese companies. On the other hand, Japanese companies are generally more skeptical about change, and the adoption of stock options in such companies may involve a great deal of uncertainty about the outcomes. Therefore, findings of this analysis can help to understand how stock options can maximize the performance gains in Japanese business environment.

The remainder of this chapter is organized as follows. Section two explains the importance of option grants for the firm performance in Japan. Section three presents the theoretical background of this analysis. Section four is about the data, sample characteristics and methodology. Section five analyzes the changes in operating-performance measures, abnormal returns, and the behavior of management after the adoption of stock option plans. Section six examines the relationship between the intensity of stock options and the performance of the adopting firms. Section seven investigates the sources of increase in the performance of adopting firms. Section eight concludes this chapter and section nine presents the limitations of this analysis.

4.2. Use of stock options and firm performance in Japan

The use of stock options has increased drastically since the amendments in the commercial code of Japan in 1997. Reasons for this increase include the transitions of

traditional corporate governance structure that once rested on three strong pillars of main banks, cross-shareholdings, and lifetime employment. After the burst of the bubble economy, a decrease in the economic growth and low credit ratings of Japanese banks put pressure on the companies to compete for capital in the global markets, which means that a higher stock price is essential. Additionally, companies feel compelled to compete with international rivals that offer stock options to attract and hire quality personnel.

The introduction of a performance-based compensation such as stock options can be the first step in shifting from traditional business models to one that is more market-oriented. This may help to make the top management of Japanese companies to take more notice of stock prices that can accelerate the move of re-gaining profitability and competitiveness after the burst of bubble economy.

Stock options can provide the necessary commitment to the owners and shareholders by aligning their interests with the interests of management. Similarly, it can help to establish important mechanisms to insure investors and shareholders that they will recover the money they invested. The increasing use of stock options in Japan also indicates that the importance of making the executives' benefits and shareholders' benefits coincide through stock-based compensation, is gaining greater recognition, as the Japanese corporate governance shifts from the traditional relationship-oriented style to one that is more market-oriented.

However, it is often hypothesized that the pay-performance sensitivity in Japan is less sensitive in terms of stock-market performance (Kato and Kubo, 2006). In this analysis, we address the question of how stock options are affecting the firm's performance in Japan.

4.3. Theoretical background

According to the agency theory, option grants can motivate managers to make decisions inline with the requirements of shareholders (Jensen and Meckling, 1976; Demsetz and Lehn, 1985). The supporters of the incentive alignment idea present stock options as a tool to mitigate the agency problems and thus improve the firm's performance (e.g., Hall and Liebman, 1998). Option grants, to attract and retain the potential employees for a durable profit maximizing, are also consistent with the incentive alignment idea (Fudenberg et al., 1990; Kole, 1997; Hale, 1998). Stock options as an alternative way of monitoring have also been documented by previous researchers in order to maximize the profitability of the firm (Himmelberg et al., 1999; Core and Guay, 1999). Similarly, some studies also provide evidences about using stock options and improvements in the performance of the firms having dispersed ownership structure (Morck et al., 1988; McConnell and Servaes, 1990). Bryan et al. (2000) and Hanlon et al. (2003) explain the association between the intensity of option incentives and the hypothesized economic motivations of granting options.

While the incentive alignment idea is well established and the need of incentive alignment for profit maximization is logically recognized, some of the empirical work has produced contentious results about the performance consequences of option grants. In this regard, the senior managers' control on the pay setting process, the timing and type of information-release are the major concerns presented in the previous studies (Jenter, 2001; Meulbroek, 2001; Hall and Murphy, 2002). Additionally, the appointments of inside directors (some of whom are members of the compensation committee) are generally influenced by the top management (Hermalin and Weisbach, 1998; Shivdasani

and Yermack, 1999). These issues are important in the Japanese environment where the traditional corporate governance committee serves at the discretion of the CEOs.

Meanwhile, some studies challenge the empirical relationship of economic motivations and option grants (e.g., Yermack, 1995). The inability of managers and employees to hedge the risk may also reduce the incentive level of option-based compensation (Aggarwal and Samwick, 1999). Recently, some researchers also report the abuse of options by the managers to increase their wealth at the cost of firm's value (Carpenter and Remmers, 2001; Bens et al., 2002).

We address the question of performance consequences of stock options in Japan, by considering these controversial views about the efficiency of option grants. For this purpose, we use multiple measures of firm performance to see the effect of option grants on increasing the net economic value of a firm. Initially, we compare the operating-performance measures such as: the changes in number of employees, sales volume, operating income, net income, and return on the asset ratio of the firms. Next we use the abnormal returns to examine changes in the market value of a firm after the announcement of an option plan.

This analysis is different from the previous work on this issue in several ways. For instance, among previous studies, Aboody et al. (2002), Yermack (1994) and Mehran (1995) find some results about the increased performance by rewarding options to CEO. However, they concentrate exclusively on the CEO option grants by using a sample of US companies, mostly in 1980s. Frye (1999) also examine the performance in response to option grants but use Tobin's Q as a measure of firm performance, which may present the growth opportunities rather than the resultant performance. Kadia and Mazumdar

(2002) try to associate the firm performance with the option grants. However, their sample includes 200 largest firms of Nasdaq. Ittner et al., (2002) concentrate on the new economy firms to find the relationship of option grants with the performance by using a sample of US firms. Kato et al. (2005) provide some evidence of improvements in the performance of Japanese firms after the adoption of stock option plans by using the data of stock option announcements before 2001²⁷. On the other hand, we use multiple measures of firm performance and a longer and more recent data set.

This analysis is also different from the previous studies that use a sample of US companies to associate the intensity of stock options with the firm's performance²⁸. In an efficient market, due to the forward looking nature of the stock prices, the return of such firms may be affected by the trend in the market. Our sample includes Japanese companies where the stock option compensation system is in an evolution stage and many companies are in the processes of adopting this form of compensation schemes. We use the data of stock option plan announcements since the beginning of this practice in 1997, up to 2004. This allows to have a closer look of how the performance of the firms changes after the adoption of stock option schemes.

An important issue in the debate of stock options is the misuse of option grants by self-serving managers to enrich themselves at the cost of the shareholders' wealth (Tufano, 1996; Yermach, 1994, 1995; Aboody and Kasznik, 2000). Ofek and Yermach

²⁷ Further amendments in the commercial code of Japan in 2001, alleviate the limits on the number of shares that can be granted as stock options as well as to whom the options can be granted, making it easier for the companies to use stock options as compensation for employees.

²⁸ For instance, Core and Guay (2001) use a sample of US companies having already established option-based compensation system to analyze the association between the intensity of option grants and firm performance.

(2000) explain that executives sell their existing stocks after the announcement of the stock option plan. This may indicate the uncertainty in the views of executives about the expected outcomes of the options, which can substantially reduce the incentive level of such compensation. Changes in the stock ownership of top executives after the stock option plan announcement may help to analyze this concern. Similarly, the reductions in dividend payout can boost the stock price temporarily (Lambert et al., 1989). If the dividend policy changes after the announcement of a stock option plan, it may indicate the opportunistic behavior on the part of executives to increase the stock price provisionally. We analyze the behavior of management after the announcement of option plans in Japan to investigate the chances of such manipulations. For this purpose, we examine the changes in board-member ownership and the dividend policy following the option plan announcements.

A related issue is how a company can get maximum benefits by granting stock options. Whether it is possible for all the companies to get positive abnormal returns simply by granting more options or the performance gains are associated with the economic determinants of granting options. In order to address these issues, we define the performance gains in association with the economic determinants and motives of granting options. We have discussed these determinants in detail in the previous chapter. However, it is important to analyze whether the performance gains from options are associated with the presence of these conditions. In this analysis we include the growth opportunities, risk and cash flow constraints to see how the performance gains increase in association with these determinants. We propose that a greater use of stock options can produce a better

firm performance when it is associated with these economic determinants of granting options.

4.4. Data, sample and methodology

Sample and data set used in this chapter are similar to the previous chapter. We use the cross sectional data of 12,896 firm-year observations from 1997 to 2004. This sample includes the data of 1,612 listed companies of the Tokyo Stock Exchange. Information about the announcements of stock option plans is obtained from 'Daiwa Securities'.

There are 1,938 stock option plan announcements among the sample companies from 1997 to 2004. We use multiple measures to examine the changes in the firm performance after the announcement of a stock option plan. Data about the operating-performance measures and board-member ownership is collected from the Nikkei NEEDS database. Information about the firm's annual stock returns, industry returns, market-portfolio returns, and annual dividend yield is collected from the 'Japan Securities Research Institute' (JSRI) CD-ROM database.

We use the data of the stock option announcements starting from the beginning of this practice in 1997 up to 2004. During this time period, firms in Japan have been undergoing a transition from traditional corporate governance structure and have been experimenting with new contracting technologies to regain profitability. Additionally, with the decreasing role of main banks, companies need to access the international capital market, which means a higher stock price is necessary. An efficient way of doing so

appears to be in the form of stock option based compensation. However, because of uncertainty and more importantly, because of differences in beliefs about the outcomes of stock option based compensation, it is important to analyze the net economic value addition to the firm following the announcement of an option plan in Japan.

In order to analyze the issue of performance consequences of stock options, we address three research questions. First, whether “the firms using stock options”(adopting sample) demonstrate better performance than “the firms that do not use stock options”(non-adopting sample)? In this regard, initially we compare these two groups to analyze univariate changes in the different measures of firm performance and next we use the regression analyses to see the post adoption changes in these performance measures.

Our second research question is that if the firms using stock options are able to increase the performance gains, whether these performance gains increase with the intensity of option grants? To address this question, first we analyze the univariate relationship between the intensity of option grants and the performance gains. Next we include the board-member ownership and bonus, and use a regression analysis to find out how these traditional instruments can be used in combination with the option grants to formulate an optimal employment contract in Japanese companies.

Third research question that we address in this chapter is to investigate where these performance gains come from? We analyze the use of stock options in association with the economic determinants of granting options to explain the performance gains from option grants. These research questions are presented and analyzed with the help of data as follows.

4.5. Post adoption changes in the firm performance and the behavior of management

We use the agency theory framework to analyze the changes in the firm performance after the announcement of stock options in Japanese companies. Both the operating-performance measures and abnormal returns are analyzed to see the impact of stock option announcements on increasing the firm's value. Companies in Japan have been increasingly adopting this type of compensation schemes to overcome the gap of a performance-based compensation system with a retention of valuable employees. As the potential benefits of stock options are able to fulfill the requirements of Japanese companies after the burst of bubble economy, it is plausible to hypothesize that option grants have a positive effect on the performance of these companies. First, we analyze the changes in the operating-performance measures on the basis of following hypothesis:

Hypothesis: H-4.1.1: The use of stock options increases the operating-performance of firms.

We use five different measures of operating performance. These are changes in the number of employees, sales volume, operating income, net income and profitability of a company. A change in the number of employees is calculated as below.

$$EMPLCHG_{i(T,T+1)} = \frac{EMPL_{i,T+1} - EMPL_{iT}}{EMPL_{iT}} \times 100, \text{ where } EMPLCHG_{i(T,T+1)} \text{ is}$$

the percentage change in the number of employees of firm i from year T to $T+1$. $EMPL_{iT}$ is the total number of employees of firm i in the year T and $EMPL_{i,T+1}$ is the total number of employees of firm i in the year $T+1$.

Second measure of operating performance is the change in sales volume. It is calculated as follows.

$$SALECHG_{i(T,T+1)} = \frac{SALE_{i,T+1} - SALE_{iT}}{SALE_{iT}} \times 100, \text{ where } SALECHG_{i(T,T+1)} \text{ is the}$$

percentage change in the sales volume of firm i from year T to $T+1$. $SALE_{iT}$ is the total sale of firm i in the year T and $SALE_{i,T+1}$ is the total sale of firm i in the year $T+1$.

Third measure of operating performance is the change in operating income. It is given as below.

$$OPINCHG_{i(T,T+1)} = \frac{OPIN_{i,T+1} - OPIN_{iT}}{OPIN_{iT}} \times 100, \text{ where } OPINCHG_{i(T,T+1)} \text{ is the}$$

percentage change in the operating income of firm i from the year T to $T+1$. $OPIN_{iT}$ is the operating income of firm i in the year T and $OPIN_{i,T+1}$ is the operating income of firm i in the year $T+1$.

Fourth measure of operating performance is the change in net income. It is calculated as below.

$$NTINCHG_{i(T,T+1)} = \frac{NTIN_{i,T+1} + NTIN_{iT}}{NTIN_{iT}} \times 100, \text{ where } NTINCHG_{i(T,T+1)} \text{ is the}$$

percentage change in the net income of firm i from year T to $T+1$. $NTIN_{iT}$ is the net income of the firm i in the year T and $NTIN_{i,T+1}$ is the net income of the firm i in the year $T+1$.

Finally, we use the profitability of firm as a measure of operating performance. It is presented as the return on asset ratio (ROA) of firm.

$$ROA_{i,T+1} = \frac{NTIN_{i,T+1}}{ASSET_{i,T+1}}, \text{ where } ROA_{i,T+1} \text{ is the return on asst ratio of firm } i \text{ in the}$$

year $T+1$. $NTIN_{i,T+1}$ and $ASSET_{i,T+1}$ stands for the net income and total assets of the firm i in the year $T+1$.

To analyze the effect of stock options on the operating performance measures, we combine these variables in the estimating Eq.(1). It is presented as below.

$$SOA_{iT} = \alpha + \beta_1 EMPLCHG_{i(T,T+1)} + \beta_2 SALECHG_{i(T,T+1)} + \beta_3 OPINCHG_{i(T,T+1)} + \beta_4 NTINCHG_{i(T,T+1)} + \beta_5 ROA_{i,T+1} + \mu, \quad Eq.(1)$$

where SOA_{iT} represents a dummy variable having value one when firm i announces a stock option plan in the year T and zero otherwise. α is a constant and β_1 to β_5 present the coefficients of different variables. μ is a standard error factor.

As stock options are not included in the expense, it may improve the operating income and net income figures in the accounting statement (though changes in the number of employees and sales volume may not be effected). However, due to these concerns, next we analyze the firm's abnormal returns to see the effect of option grants on increasing the firm's value. Thus, our next hypothesis follows as below.

Hypothesis: H-4.1.2: The use of stock options increases the abnormal returns of firms.

We use three measures of abnormal return. First is the market adjusted rate of return on the company stock. It is obtained from JSRI, CD-ROM database and is given as follows.

$$ROR_{i,T+1} = \left\{ \frac{\bar{P}_{T+1}^i}{\bar{P}_T^i} \right\} - 1, \text{ where } ROR_{i,T+1} \text{ stands for the market adjusted annual}$$

stock rate of return of firm i in the year $T+1$. $\bar{P}_T^i = \frac{1}{12} \sum_{t \in T} \bar{P}_t^i$ (\bar{P}_t^i is the market adjusted stock price of firm i during the month t).

Selecting a certain type of compensation is also a function of different factors associated in a particular time and sector of the economy. Bebchuk et al. (2001) explains the difficulty to exactly measure the performance consequences of the stock options in the absence of indexed options that can filter out general market trends. In order to eliminate these concerns, we use the firm's returns related to the industry returns and firm's returns related to the market-portfolio returns, as our next two measures of abnormal returns. Stock returns of the firm related to the industry returns are denoted as *RORIND* and calculated as follows.

$RORIND_{i,T+1} = ROR_{i,T+1} - INDRATE_{T+1}$, where $RORIND_{i,T+1}$ denotes the firm i 's rate of return related to the industry return during the year $T+1$. $INDRATE_{T+1}$ is the industry return during the year $T+1$. It is obtained from JSRI, CD-ROM database and is given as $\frac{1}{N'} \sum_i^{N'} ROR_{i,T+1}$ (N' is the total number of firms in the industry).

The third measure of abnormal return is the firm's returns related to the market-portfolio returns of the Tokyo stock exchange. It is defined as follows.

$RORMKT_{i,T+1} = ROR_{i,T+1} - MKRATE_{T+1}$, where $RORMKT_{i,T+1}$ presents the firm i 's rate of return related to the market-portfolio return in the year $T+1$. $MKRATE_{T+1}$

presents the market-portfolio return of Tokyo Stock Exchange during the year $T+1$. It is obtained from JSRI, CD-ROM database.

We expand Eq.(1) by including the measures of abnormal returns. Three measures of abnormal returns are used alternatively and Eq.(1) takes the following form.

$$\begin{aligned} SOA_{it} = & \alpha + \beta_1 EMPLCHG_{i(T,T+1)} + \beta_2 SALECHG_{i(T,T+1)} + \beta_3 OPINCHG_{i(T,T+1)} \\ & + \beta_4 NTINCHG_{i(T,T+1)} + \beta_5 ROA_{i,T+1} + \beta_6 (ROR_{i,T+1}, RORIND_{i,T+1}, RORMKT_{i,T+1}) \\ & + \mu. \end{aligned} \tag{Eq.(2)}$$

According to Ofek and Yermack (2000), most of the executives sell the existing owned stocks after the announcement of the option plan, which may reduce the incentive effect of such compensation as a whole. The reduction in the ownership of the top executives after the adoption of the option plan may also indicate the lack of trust from the management on the efficiency of option grants to increase the firm's value. On the other hand, if the stock ownership of top executives shows an increasing trend, it may indicate the managers' believes that the intrinsic firm value will increase rather than just a temporary rise of stock prices in response to the option grants. A positive change in the ownership may also imply that top executives see any gain in the stock price, after the adoption of option plan, as a sustainable value addition to the firm. Thus, if stock options are working positively in the Japanese business environment, it is plausible to hypothesize as follows.

Hypothesis: H-4.1.3: The use of stock options increases the level of executive-ownership in firms.

Executive stock options are not dividend protected. The reductions in dividend payout after the adoption of option plans may help to boost the stock price temporarily to maximize the gains on options (Lambert et al., 1989). In order to investigate the possibility of this misuse of stock options, it is important to analyze the changes in dividend policy after the announcement of option plans. Therefore we hypothesize as below.

Hypothesis: H-4.1.4: The use of stock options has no affect on the dividend yield.

Variation in the top executive ownership is captured with a measure of change in the board-member ownership after the announcement of stock options. It is calculated as below.

$$OWNCHG_{i(T,T+1)} = \frac{OWN_{i,T+1} - OWN_{iT}}{OWN_{iT}} \times 100, \quad OWNCHG_{i(T,T+1)} \text{ denotes the}$$

percentage change in the board-member ownership of firm i from the year T to $T+1$. OWN_{iT} is the board-member ownership of firm i in the year T and $OWN_{i,T+1}$ is the board-member ownership of firm i in the year $T+1$.

$DIVDY_{i,T+1}$ presents the annual dividend yield of the firm i in the year $T+1$.

Dividend yield is obtained from JSRI, CD-ROM database and is given as below.

$$DIVDY_{i,T+1} = \frac{1/2 \{ \bar{D}_T^i + \bar{D}_{T+1}^i \}}{\bar{P}_T^i}.$$

We include the variables of change in the board-member ownership and dividend yield in Eq.(2). It is arranged as follows.

$$\begin{aligned}
 SOA_{it} = & \alpha + \beta_1 EMPLCHG_{i(T,T+1)} + \beta_2 SALECHG_{i(T,T+1)} + \beta_3 OPINCHG_{i(T,T+1)} \\
 & + \beta_4 NTINCHG_{i(T,T+1)} + \beta_5 ROA_{i,T+1} + \beta_6 (ROR_{i,T+1}, RORIND_{i,T+1}, RORMKT_{i,T+1}) \\
 & + \beta_7 OWNCHG_{i(T,T+1)} + \beta_8 DIVDY_{i,T+1} + \mu.
 \end{aligned}
 \tag{Eq.(3)}$$

4.5.1. Univariate analyses

First, we analyze the univariate changes in the performance measures, board-member ownership, and dividend yield after the announcement of an option plan. For this purpose, the sample is divided into the ‘adopting sample’ and ‘non-adopting sample’. Firm-year observations are included in the adopting sample if the firm has a stock option plan announcement; otherwise the observation is included in the non-adopting sample. The *t*-test and the *Wilcoxon*-test are used to examine the significant difference in the means of the adopting sample and the non-adopting sample.

Table 4.1 shows the descriptive statistics of the full sample. Table 4.2 divides the sample into the adopting sample and non-adopting sample. The last two rows of Table 4.3 present the results of the *t*-test and *Wilcoxon*-test. These values indicate considerable improvements in the performance measures after the stock option plan announcements. Adopting sample shows improvements in the number of employees, sales volume, operating income and the profitability (measured as return on asset ratios). However, as discussed earlier, the firms granting stock options may have a smaller amount of compensation expense in their income statements as compared to the firms paying in cash that may cause improvements in the operating-performance measures. Therefore, firms’ abnormal returns are also examined to see the market reaction after the announcement of

Table 4.1

Descriptive statistics of variables used in the analyses (full sample)^a

| Variables | EMPCHG | SALCHG | OPNCHG | NTNCHG | ROA | ROR | RORIND | RORMRK | OWNCHG | DIVDY |
|---------------|--------|--------|---------|---------|--------|---------|---------|---------|---------|-------|
| Mean | -7.31 | -3.82 | 7.96 | -2.00 | 0.84 | -0.81 | -4.67 | -7.44 | 10.25 | 1.05 |
| Median | -9.21 | -6.17 | 21.31 | 18.29 | 0.89 | -0.65 | -7.40 | -10.30 | 11.00 | 0.95 |
| St. Deviation | 12.48 | 17.98 | 70.22 | 84.77 | 4.22 | 35.97 | 30.75 | 37.09 | 51.433 | 0.98 |
| Minimum | -40.85 | -46.99 | -172.13 | -169.45 | -19.00 | -162.60 | -169.50 | -178.30 | -204.53 | 0.00 |
| Maximum | 61.48 | 96.33 | 194.94 | 154.94 | 12.00 | 157.20 | 126.10 | 128.40 | 204.52 | 4.01 |
| Skewness | 0.18 | 0.86 | -0.23 | -0.83 | -0.38 | -0.03 | 0.13 | 0.06 | -0.05 | 0.73 |

^a Sample consists of 12,896 firm-year observations of the companies listed on Tokyo stock exchange (Between 1997 and 2004). There are 1,938 stock option plan announcement events between 1997 and 2004. EMPCHG, SALCHG, OPNCHG and NTNCHG are the rate of change in the number of employees, sales, operating income and net income, respectively. ROA is the return on assets ratio of firm in a given year. ROR is the annual rate of return on company stock. RORIND and RORMKT are the rate of return on the company stock adjusted for industry rate of return and market-portfolio rate of returns of Tokyo stock exchange. OWNCHG is the rate of change in the board-member ownership of company stock. DIVDY is the annual dividend yield on the company stocks. All the ratios are in percentage. To avoid the effects of outliers, the variables are winsorized at the 1st- and 99th-percentiles.

Table 4.2

Differences of means between the ‘contracting sample’ and ‘non-contracting sample’^a

| | EMPCHG | SALCHG | OPNCHG | NTNCHG | ROA | ROR | RORIND | RORMRK | OWNCHG | DIVDY |
|---|--------|--------|--------|--------|-------|-------|--------|--------|--------|-------|
| Contracting sample (1,938 observations) | 2.12 | 6.63 | 8.87 | 14.43 | 2.40 | 15.91 | 2.58 | 0.40 | 21.28 | 0.97 |
| Non-contracting sample (10,961 observations) | -9.14 | -5.86 | 7.78 | 4.80 | 0.55 | -3.83 | -5.98 | -8.86 | 8.08 | 1.06 |
| Difference | 11.26 | 12.49 | 1.09 | 10.63 | 1.85 | 19.74 | 8.56 | 9.26 | 13.23 | -0.09 |
| <i>P</i> -value (<i>t</i> -test) | 0.001 | 0.000 | 0.471 | 0.021 | 0.001 | 0.001 | 0.007 | 0.001 | 0.000 | 0.000 |
| <i>P</i> -value (<i>Wilcoxon</i> -test) | 0.000 | 0.001 | 0.021 | 0.124 | 0.000 | 0.005 | 0.004 | 0.001 | 0.000 | 0.130 |

^a Sample consists of 12,896 firm-year observations of the companies listed on Tokyo Stock Exchange (between 1997 and 2004). There are 1,938 stock option plan announcement events between 1997 and 2004. The performance measures, change in the ownership level and dividend yield ratio are computed for the subsequent year of stock option plan announcement. A firm-year observation is included in the ‘contracting sample’ when the firm has a stock option plan announcement, otherwise the observation is included in the non-contracting sample. To avoid the effects of outliers, the variables are winsorized at the 1st- and 99th-percentiles.

stock options. The evidence suggests an increase in the stock-market performance of adopting sample. A positive market reaction may also indicate that investors and shareholders see the option grants as a useful mean of improving the firm value by aligning the interests of management with the shareholders. Meanwhile, the board-member ownership and dividend yield do not show any significant difference between the two groups. This may help to rule out the possibility of opportunistic behavior of the management at the cost of intrinsic firm value.

While these results provide primary evidence about the improvements in the firm value after the announcement of the stock option plan, it is important to see the multivariate changes in the performance measures by using all the factors simultaneously. Therefore, next we use the regression analyses to test out the hypothesized predictions.

4.5.2. Multivariate analyses

In this part we analyze the multivariate changes in the observed factors after the announcement of an option plan. Estimating Eqs. (1), (2), and (3) are used for the regression analyses. Table 4.3 presents the co-linearity statistics and Pearson correlation matrix of the variables. There are no signs of co-linearity and the values of the tolerance levels do not suggest the exclusion of any variable.

The results of binomial logistic regressions are presented in Table 4.4. The dependent variable is the announcement of stock option plan in all panels. It takes the value one if the firm announces a stock option plan in the observation year and zero otherwise. Panel one explains the changes in the operating-performance measures after the announcement of a stock option plan. Results indicate significant improvements in

the number of employees, sales volume and profitability (ROA) after the option plan is announced. Operating income and net income also shows positive predicted signs. These results support our hypothesis *H-4.1.1*. These are also consistent with the findings of Lambert and Larcker (1987) and Core and Guey (2001) about the positive effects of option grants on the operating-performance.

In panel 2, the regression examines the relationship of option grants with the abnormal returns of firms in addition to the operating-performance measures. The abnormal returns also show a positive association with the adoption of stock option plans. The results are unchanged when the alternative measures of abnormal returns are used in panels 3 and 4. These results are sustainable with the incentive alignment idea of stock options presented in previous studies (Jensen and Meckling, 1976; Holmstrom and Milgrom, 1987; Hall and Liebman, 1998). Results also accommodate our prediction of a positive reaction from the investors and shareholders in Japan, in response to the option plan announcement.

Using three different measures of abnormal returns helps to reduce the possibility of overestimating the performance impact of stock options due to some trend in the industry or market as a whole. Moreover, the consistency in the results of operating-performance and abnormal returns rejects the predictions that increased performance after the option plan announcement is due to the inability of investors to accurately measure the firm's value.

Results are not compliant with the idea that managers manipulate the accounting records to increase their wealth in response to option-based compensation. Previous studies reporting these misuses of stock options by the management mostly use the

Table 4.3

Co-linearity statistics and correlations matrix of independent variables

| Variable label | Co-linearity statistics | | Correlations matrix | | | | | | |
|----------------|-------------------------|---------|---------------------|--------|--------|--------|--------|---------|-------|
| | Tolerance | EMPCHG | SALCHG | OPNCHG | NTNCHG | ROA | ROR | OWNCHG | DIVDY |
| EMPCHG | 0.76 | 1.00 | | | | | | | |
| SALCHG | 0.71 | 0.54** | 1.00 | | | | | | |
| OPNCHG | 0.92 | 0.01 | -0.16** | 1.00 | | | | | |
| NTNCHG | 0.92 | 0.15** | 0.25** | 0.02 | 1.00 | | | | |
| ROA | 0.79 | 0.33** | 0.32** | 0.07* | 0.24** | 1.00 | | | |
| ROR | 0.88 | 0.11* | 0.18* | -0.10 | 0.11* | 0.19** | 1.00 | | |
| OWNCHG | 0.97 | 0.17** | 0.14* | 0.00 | 0.07 | 0.14** | -0.05 | 1.00 | |
| DIVDY | 0.92 | -0.13** | -0.14* | 0.09* | -0.7* | 0.00 | 0.20** | -0.08** | 1.00 |

*significant at the 5 percent level; **significant at the 1 percent level

Table 4.4The performance impacts of stock option plan announcements in Japan^a

| Variable label | Panel-1 | Panel-2 | Panel-3 | Panel-4 | Panel-5 | Panel-6 | Panel-7 | Panel-8 |
|------------------------|-----------------------|------------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Intercept | -1.482*** (-39.18) | -1.254*** (-21.393) | -1.176*** (-20.21) | -1.17*** (-20.07) | -1.323*** (-25.00) | -1.116*** (-17.10) | -1.128*** (-17.18) | -1.132*** (-17.18) |
| EMPCHG | 0.048*** (17.02) | 0.073*** (12.69) | 0.074*** (12.73) | 0.074*** (12.77) | 0.067*** (14.56) | 0.073*** (12.55) | 0.074*** (12.52) | 0.074*** (12.55) |
| SAELCHG | 0.012*** (7.28) | 0.021*** (8.78) | 0.022*** (9.28) | 0.022*** (9.15) | 0.021** (9.72) | 0.022*** (8.75) | 0.023*** (9.32) | 0.023*** (9.18) |
| OPINCHG | 0.001* (2.93) | 0.002* (3.78) | 0.001* (2.78) | 0.001 (2.70) | 0.001 (2.72) | 0.002* (4.22) | 0.001 (2.92) | 0.001* (2.81) |
| NTINCHG | 0.002 (3.97) | 0.001 (2.67) | 0.001 (3.34) | 0.002 (3.58) | -0.001 (3.73) | -0.001 (2.57) | -0.001 (3.21) | 0.001 (3.45) |
| ROA | 1.77** (4.48) | 0.360 (0.36) | 1.220 (5.80) | 1.509* (1.50) | 2.486* (2.58) | 0.615 (0.63) | 1.349* (1.33) | 1.638** (1.60) |
| ROR | | 0.010*** (15.93) | | | | 0.011*** (16.44) | | |
| RORIND | | | 0.004*** (5.20) | | | | 0.004** (5.18) | |
| RORMKT | | | | 0.003** (4.85) | | | | 0.003*** (4.76) |
| OWNCHG | | | | | 0.001 (0.96) | 0.001* (0.91) | 0.001 (1.02) | 0.001 (0.99) |
| DIVDY | | | | | -0.041 (1.45) | -0.112* (-3.95) | -0.037 (-1.29) | -0.030 (-1.06) |
| <i>Pseudo R-square</i> | 0.119 | 0.168 | 0.148 | 0.148 | 0.151 | 0.172 | 0.150 | 0.150 |
| Log likelihood | -3,055.9 | -2,224.5 | -2,335.4 | -2,332.1 | -2,241.1 | -2,203.9 | -2,314.23 | -2,315.2 |
| Chi-square | 699.75*** | 684.48*** | 477.07*** | 476.29*** | 266.38*** | 379.41*** | 504.90*** | 503.47*** |
| N | 12,896 | 12,896 | 12,896 | 12,896 | 12,896 | 12,896 | 12,896 | 12,896 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses report the Z-statistics computed on the bases of robust standard errors

^a Sample consists of 12,896 firm-year observations of the companies listed on Tokyo Stock Exchange (between 1997 and 2004). The dependent variable is the announcement of a stock option plan in the year T . the performance measures are calculated for the year $T+1$. For adopting firms, the dependent variable is set equal to one when the firm announces a stock option plan in the observation year and zero otherwise. For non-adopting firms, the dependent variable is set to zero for all years the firm appears in the sample. Panel 1 shows the results of operating-performance manures. Panel 2, 3 and 4 includes three different measures of abnormal returns, alternatively. Panel 5 to 8 includes dividend yield ratio and changes in the board-member ownership in addition to the performance manures. To avoid the effects of outliers, the variables are winsorized at the 1st- and 99th-percentiles.

sample of US companies (e.g., Tufano, 1996; Aboody and Kasznik, 2000; Carpenter and Remmers, 2001; Bens et al., 2002). However, we cannot observe such manipulations in the sample of Japanese firms. These results are most consistent with the findings of Kato et al. (2005) that suggest a positive effect of a well designed stock option plan on the firm's performance in Japan.

Inline with our hypothesis *H-4.1.3*, results indicate improvements in the executive shareholdings, following the announcement of a stock option plan. Though the coefficient is significant only in panel 6, a positive trend is evident in all regressions. This is contrary to the prediction of Ofek and Yermach (2000), which assumes that the top executives sell out their existing stocks when the options are announced. However this accommodates the arguments of Yermack (1995) that the executive's ownership is a function of contracting frequency—with each grant the ownership level of the executive may increase. A positive trend of executive shareholdings, following the option plan announcement may also indicate two more positive indications. First, it points towards the positive and optimistic views of managers in response to option plan announcements. This implies that managers in Japan do not necessarily believe in manipulating the performances and gaining a temporary rise in the stock price. On the other hand, when managers continue to hold the company's stocks, it shows their expectations of a sustainable improvement in the firm's value. Second, it is inline with the idea presented by Demsetz and Lehn (1985), and Himmelberg et al. (1999) that the combination of managerial ownership and the option grants help to devise an optimal contract between the managers and the firm. Therefore, an increase in the ownership of the top executives

may also present a favorable situation in order to devise a better employment contract with the executives to increase the firm performance.

Some of the previous studies, using a sample of US companies, indicate the reduction in the dividend-payout after the stock option announcements, to give a temporary rise to the stock price (e.g., Lambert et al., 1989). However, we cannot observe such practices in the Japanese sample. In the Japanese business environment, the sense of association with the firm and the traditional practices of cross-shareholdings might have minimized the possibility of such manipulations. The group structure of companies that is still present up to some extent can also have a role that reduces the chances of such practices. Consequently, it is reasonable to conclude that evidence from the Japanese sample contrasts with the view that self-serving managers use stock options to enrich themselves at the cost of firm's value.

4.6. The intensity of stock options and performance of the adopting firms

The evidence from the previous section indicates improvements in the performance measures following the announcement of a stock option plan. However, it is interesting to investigate whether the firm performance is a function of option-grant intensity. In other words, if the adoption of an option plan positively affects the firm's value, increasing the amount of option grants may increase this effect. Therefore, it is reasonable to hypothesize as follows.

Hypothesis: H-4.2.1: The greater the intensity of option grants, the stronger the positive effect on the firm's performance.

While discussing the effect of pay structure on the firm's performance, it is important to note that the ownership of the company's stock by the top executives can also serve as an alternative equity incentive for the top executives. In other words, when top executives possess a significant number of company stocks, the need of stock options as an equity incentive is minimized (Jenter, 2001). Thus, the companies with a limited level of ownership by the top executives are stronger candidates for the option grants. On the other hand, when companies offer stock options more frequently the top executives' ownership level is expected to increase (Yermack, 1995). Other things being equal a greater ownership of the company stock helps to increase the firm's performance. Therefore, it is reasonable to propose that a higher level of executive ownership positively affects the firm's performance.

Hypothesis: H-4.2.2: The higher the level of executive-ownership, the better the firm's performance.

Bonuses are another instrument widely used in Japanese companies to provide incentives to top management. A significant portion of the Japanese executive compensation comes from bonuses (Kato and Kubo, 2006). It is plausible to hypothesize that in Japanese business environment, an optimal employment contract can be formulated with the combination of stock options, stock ownership, and bonuses for the executives.

Hypothesis: H-4.2.3: The higher the amount of executive bonus, the better the firm's performance.

Barber and Lyons (1996) explain that in certain circumstances it is important to control the past performance, in tests examining the association between some event and

subsequent firm performance. The firms performing better are expected to have an edge in the subsequent accounting periods.

Hypothesis: H-4.2.4: Firm's past performance has a positive effect on the subsequent performance.

The ratio of option grants to the total outstanding shares of the company is used as a measure of the option-grant intensity. It is presented as *SOGRANT*. Number of shares held by the board members as a percentage of total outstanding shares represents the executives' ownership level. It is coded as *EXEOWN*. Bonuses are presented as the amount of top executive bonuses scaled by the total annual sales of the company. It is denoted as *EXBONUS*. The lagged value of return on equity of the firm is used as a control for the past performance. It is denoted as *ROE*. The empirical settings for the regression analyses are presented in Eq.(4).

$$\begin{aligned} (ROR_{i,T+1}, RORIND_{i,T+1}, RORMKT_{i,T+1}) = & \alpha + \beta_1 SOGRANT_{iT} + \beta_2 EXOWN_{iT} \\ & + \beta_3 DIRBONUS_{iT} + \beta_4 ROE_{iT} + \mu, \end{aligned} \quad Eq.(4)$$

where α presents a constant, β_1 to β_4 stands for the coefficients of different variables. $SOGRANT_{iT}$ is the option-grant intensity of firm i during the year T . $EXOWN_{iT}$ is the board-member ownership as a percentage of total outstanding shares of the firm i during the year T . $DIRBONUS_{iT}$ is the amount of bonuses scaled by the total sales of firm i during the year T . ROE_{iT} is the return on equity of firm i in the year T and μ is a standard error factor.

In order to analyze the association of *SOGRANT* with the performance gains, we use a reduced sample of the 1938 stock option announcements from 1997 to 2004. Table

4.5 presents the average amount of option grants as a percentage of total outstanding shares in different years. With an exception of 2001, the average option grant rate has an increasing trend. Greater average option-grant intensity in the year 2001 may be due to

Table 4.5

Average amount of option grants across different years^a

| Year | Number of option plan announcements | Average amount of option grants |
|------|-------------------------------------|---------------------------------|
| 1997 | 74 | 1.52 |
| 1998 | 74 | 1.33 |
| 1999 | 244 | 1.28 |
| 2000 | 261 | 1.15 |
| 2001 | 321 | 3.69 |
| 2002 | 338 | 1.75 |
| 2003 | 322 | 1.56 |
| 2004 | 304 | 1.82 |

^a The amount of option grants is computed in terms of the percentage of total number of outstanding shares of a company.

the spontaneous reaction of the companies in response to the second amendments in the commercial code of Japan, which unrestricted the limits on the number of options that can be offered as stock options.

For the empirical analyses, first we analyze the univariate changes in the performance measures in response to the option-grant intensity and then use the regression analyses to investigate the multivariate changes in the firm value with the option-grant intensity, executive ownership and bonuses.

4.6.1. Univariate analyses

Initially, we use the univariate analyses to see the relationship of *SOGRANT* with different measures of firm performance. All measures of operating-performance and abnormal returns are calculated similar to the previous section and assigned the similar codifications. Following Kedia and Mazomdar (2001) the sample is divided in quintiles with respect to the *SOGRANT*. Table 4.6 presents the mean values of the performance measures in the quintiles formed on the basis of *SOGRANT*.

The values of both operating-performance measures and abnormal returns improve when we move from lowest quintile to the highest quintile. As discussed earlier, we eliminate the concerns of results being affected by the favorable accounting treatment of the options, by including the abnormal returns as the main predictors of the firm performance. Our results show the consistent behavior in both types of performance measures. A positive market reaction also implies that the announcement of stock options is welcomed by the investors and shareholders as an effective way of improving the firm performance. These primary evidences are able to support the prediction about the positive relationship of option-grant intensity with the performance gains. However, next we analyze the multivariate changes in the performance measures after including the board-member ownership and amount of bonuses.

4.6.2. Multivariate analyses

Though the initial results of univariate analyses show a positive association of option-grant intensity with the performance measures, in this part we investigate the

Table 4.6
Option-grant intensity and the firm performance^a

| Quintiles | No. of firms | SOGRANT | EMPCHG | SALCHG | OPNCHG | NTNCHG | ROA | ROR | RORIND | RORMKT |
|-----------|--------------|---------|--------|--------|--------|--------|------|-------|--------|--------|
| 1 | 387 | 0.09 | -2.95 | 1.82 | 6.68 | 1.96 | 1.68 | 9.60 | -0.34 | -2.30 |
| 2 | 387 | 0.37 | 1.37 | 6.22 | 8.68 | 17.00 | 2.71 | 15.25 | 2.19 | 1.07 |
| 3 | 387 | 0.89 | 2.77 | 7.24 | 7.23 | 19.76 | 2.79 | 11.85 | 4.97 | 0.30 |
| 4 | 387 | 1.83 | 3.03 | 6.36 | 8.52 | 13.60 | 3.01 | 13.22 | 3.19 | 3.18 |
| 5 | 390 | 4.48 | 5.64 | 11.41 | 9.76 | 23.00 | 3.11 | 21.59 | 7.87 | 6.11 |

^a The reduced sample consists of 1,938 stock option plan announcements (between 1997 and 2004). Option-grant intensity is the amount of option grants as the percentage of total outstanding stocks of firm. it is referred as SOGRANT. Table displays mean values of performance variables by the quintiles of option-grant intensity. EMPCHG, SALECHG, OPINCHG and NTNCHG are the rate of change in the number of employees, sales, operating income and net income, respectively. ROA is the return on assets ratio of firm in a given year. ROR is the annual rate of return on company stock. RORIND and RORMKT are the rate of return on the company stock adjusted for industry rate of return and market-portfolio rate of returns of Tokyo Stock Exchange. OWNCHG is the rate of change in the board-member ownership of company stock. DIVDY is the annual dividend yield on the company stocks. All the ratios are in percentage.

multivariate changes in the performance by using regression analyses according to Eq.(5). For this purpose, we use the linear regressions.

Table 4.7 presents the descriptive statistics of the variables used in the regression. Table 4.8 shows the correlation matrix and co-linearity statistics of dependent variables. The results of the regression analyses are presented in Table 4.9. Consistent with the univariate analyses, the increases in the option-grant intensity show a positive effect on the firm's performance. Similarly, evidence suggests an increase in the abnormal returns with a higher level of executive ownership. Though *EXBONUS* does not get to a significant level, a positive trend is still evident.

The results do not change when the dependent variable is used as the firm rate of returns related to the industry rate of returns and related to the market-portfolio rate of returns. This coincides with previous studies (e.g., Bryan et al., 2000; Hanlon et al., 2003; Core and Guey, 2001) that explain the association between the intensity of options and the firm's performance. Similarly, the findings accommodate the idea that an optimal employment contract in the Japanese environment may include the combination of stock options, stock ownership, and executive bonuses.

With the restructuring of the traditional corporate governance in Japan, some of the traditional practices can have a successful combination with the new contracting technologies to formulate an optimal employment contract. In this way, the Japanese business model may develop a shape that is different from the US model. Unique characteristics and the requirements of the Japanese companies can help to assimilate the changes in the form of option-based pay without losing the benefits of traditional practices.

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Table 4.7

Summary of descriptive statistics of independent variables (reduced sample) ^a

| Variable | Description | Mean | Median | Std. Dev. | Min. | Max. | Skewness |
|----------|--|-------|--------|-----------|--------|-------|----------|
| SOGRANT | Option grant rate | 1.53 | 0.86 | 1.80 | 0.02 | 10.19 | 0.98 |
| EXOWN | Executive ownership | 0.12 | 0.10 | 0.11 | 0.00 | 6.00 | 0.89 |
| EXBONS | Executive bonus | 0.07 | 0.03 | 0.11 | 0.00 | 0.61 | 0.73 |
| ROE | Return on equity | 5.04 | 4.79 | 12.82 | -52.02 | 55.03 | 0.20 |
| RD_RATIO | Research and development | 0.01 | 0.008 | 0.01 | 0.00 | 0.04 | 0.66 |
| RISK | Risk associated with the company stock | 10.12 | 9.93 | 5.83 | 2.48 | 26.56 | 0.48 |
| CASHCON | Cash flow constraint | 0.10 | 0.00 | 0.31 | 0.00 | 1.00 | 1.01 |

^a The reduced sample consists of 1,938 stock option plan announcements (between 1997 and 2004). ROE is return on equity ratio of a firm to present the past performance of the firm. EXOWN present the ownership of the top executives. It is the percentage of board-member ownership. EXBONS is the amount of bonus paid to executives as a percentage of total sales. SOGRANT is the amount of option grants as the percentage of total outstanding stocks of firm. RD_RATIO is R&D expense scaled by the total assets of the company. RISK present the risk associated with the company stock. It is the standard deviation of the monthly stock returns of a company during the observation year. CASHCON is presented as a dummy variable taking value one if the firm does not announces any dividend during the observation year and zero otherwise.

Table 4.8

Co-linearity statistics and correlations matrix of independent variables (reduced sample)

| Variable label | Co-linearity statistics | | Pearson correlations matrix | | | | | | |
|----------------|-------------------------|------|-----------------------------|---------|---------|---------|----------|---------|---------|
| | Tolerance | VIF | SOGRANT | EXOWN | EXBONS | ROE | RD_RATIO | RISK | CASHCON |
| SOGRANT | 0.83 | 1.19 | 1.00 | | | | | | |
| EXOWN | 0.89 | 1.11 | 0.22** | 1.00 | | | | | |
| EXBONS | 0.92 | 1.08 | 0.09** | 0.11** | 1.00 | | | | |
| ROE | 0.85 | 1.17 | 0.11** | 0.23** | 0.25** | 1.00 | | | |
| RD_RATIO | 0.95 | 1.04 | -0.17** | -0.09** | -0.08* | -0.08** | 1.00 | | |
| RISK | 0.82 | 1.20 | 0.29** | 0.22** | -0.01 | -0.008 | -0.04 | 1.00 | |
| CASHCON | 0.82 | 1.20 | -0.22** | -0.23** | -0.17** | -0.19** | -0.14** | -0.22** | 1.00 |

*significant at the 5 percent level; **significant at the 1 percent level

Table 4.9Option-grant intensity and the performance of firms^a

| Variable label | ROR | RORIND | RORMKT | ROR | ROR | ROR | ROR |
|--------------------|--------------------|---------------------|----------------------|---------------------|---------------------|---------------------|--------------------|
| Intercept | -1.58* (-1.18) | -4.93*** (-3.58) | -6.815*** (-4.42) | 13.88*** (-2.83) | -6.02*** (-3.58) | -6.37*** (-2.26) | 9.98* (1.68) |
| SOGRANT | 0.14*** (6.04) | 0.16*** (6.88) | 0.16*** (6.57) | 0.10** (7.37) | 0.08* (6.85) | 0.10 (2.08) | 0.15** (2.48) |
| EXOWN | 0.17*** (7.00) | 0.17*** (7.15) | 0.13*** (5.46) | 0.10*** (4.56) | 0.15*** (6.34) | 0.10*** (4.45) | 0.14*** (5.99) |
| EXBONS | 0.003 (0.11) | 0.001 (0.11) | 0.00 (0.01) | 0.01 (0.57) | 0.005 (0.22) | 0.01 (0.43) | 0.004 (0.16) |
| ROE | 0.29*** (12.05) | 0.26*** (10.82) | 0.21*** (8.68) | 0.31*** (13.02) | 0.28*** (12.03) | 0.28*** (12.11) | 0.30*** (12.24) |
| RD_RATIO | | | | 0.05* (2.26) | 0.05* (2.03) | | |
| RISK | | | | 0.19*** (8.00) | | 0.06* (1.93) | |
| CASHCON | | | | -0.03 (-1.53) | | | -0.08 (-1.28) |
| RD_RATIO × SOGRANT | | | | | 0.13*** (3.51) | | |
| RISK × SOGRANT | | | | | | 0.37*** (6.62) | |
| CASHCON × SOGRANT | | | | | | | 0.04 (0.61) |
| R-square | 0.161 | 0.153 | 0.121 | 0.23 | 0.20 | 0.25 | 0.197 |
| F-value | 73.41*** | 69.42*** | 47.72*** | 66.09*** | 65.22*** | 85.16*** | 62.62*** |
| N | 1938 | 1938 | 1938 | 1938 | 1938 | 1938 | 1983 |

* significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level

Note: numbers in parentheses are *t*-statistics computed on the bases of robust standard errors^a The sample consists of 1,938 stock option plan announcements (between 1997 and 2004). The dependent variable takes three forms. ROR is the rate of return on the company stock. RORIND is the rate of return on the company stock adjusted for industry rate of return, and RORMKT is the rate of return on company stock adjusted for market-portfolio rate of return. All the independent variables are lagged one year.

4.7. Sources of increase in the firm performance

While the results of previous section show a positive association of the option-grant intensity with performance measures, it is not clear where these positive effects come from. It is important to analyze, whether it is possible for all firms to achieve positive abnormal returns by simply granting more options, or there is any systematic association between the gains from option grants and the determinants of using the stock options. To include these aspects, we analyze the performance gains of option grants in relation to three different determinants of the option grants.

First, previous literature (e.g., Demsetz and Lehn, 1985; Jensen and Meckling, 1992; Smith and Watts, 1992) supports the use of stock options in case of greater growth opportunities. Based on this it is plausible to hypothesize that greater use of stock options can produce better resultant performance if the growth opportunities set is higher for the firm. For this purpose, the research and development (R&D) expense scaled by the total assets of the company is used as a measure of growth opportunities. It is calculated similar to the previous chapter and denoted as *RD_RATIO*. Interacting this variable with the *SOGRANT* gives another variable to analyze how the performance gains from option grants change in association with the growth opportunities.

Second, the performance gains may increase with respect to the chances of attracting and retaining the key employees by using the option-based compensation. According to Aggarwal and Samwick (1999) a high risk reduces the incentive level of equity-based compensation, because of the inability of managers and employees to hedge the risk. On the other hand however, firms with a high risk are more likely to utilize stock options to attract and retain less risk-averse and more optimistic employees (Ittner et. al.,

2002). Consequently, if the firm is able to successfully use the risk to attract and retain the most suitable employees, the use of option grants can create a greater positive impact on the firm value. Risk associated with the company stock is used to present the greater chances of attracting the most suitable employees. Similar to the previous chapter, risk is measured as the standard deviation of the monthly returns on the company stock during the observation year and is denoted as *RISK*. Interacting the *RISK* with the *SOGRANT* gives another variable to test how performance gains change when stock options are used in greater risk conditions.

Third, companies with cash flow constraints may be able to get better advantage of using stock options (e.g., Yermack, 1995; Core and Guey, 1999). Thus, it is predictable that such firms may show greater improvements in the abnormal returns with the use of option-based compensation. A zero dividend payment is used to present the cash flow constraints. Again similar to the previous chapter, it is measured with a dummy variable having value “one” if firm has a zero dividend payment during the observation year and “zero” otherwise. It is denoted as *CASHCON*. Interaction of *CASHCON* with the *SOGRANT* will produce another variable to test the performance gains of option grants in case of cash flow constraints.

The results of regressions with these interacting variables are presented in Table 4.9. The results indicate that greater use of stock options in high growth firms can create greater positive impact on the performance. This is inline with the idea of using stock options to take advantage of growth opportunities. Similarly, evidence suggests the greater positive impact on the firm value, when stock options are used in high risk conditions. This is in agreement with the idea of using the risk associated with the stock

options to attract and retain the suitable employees. The results are also inline with the prediction of Oyer and Schaefer (2001) that firms make greater use of stock options to retain the potential employees when they are close competitors in the industry. In case of cash flow constraints the results cannot support the hypothesized prediction. This may be due to the fact that previous year's positive cash flow leads the firms to initiate better starts in the next accounting period, because earnings are generally mean reverting. Due to this reason, the firms with positive cash flow might be able to show greater improvements in the subsequent accounting year.

Overall these results are accommodating the hypothesized prediction that option grants can produce greater positive impacts on the firm performance when used in association with the economic determinants of option grants. Specifically, these results are able to explain how some firms are able to get better results from stock options than the others. These findings may also help to explain one of the reasons why some empirical findings produce contentious results about the performance gains of the option grants²⁹. Likewise, it can explain why firms extensively use stock options at a time when there are high growth opportunities and reduce/stop using options when growth options are normalized. The analyses of the performance gains without considering the economic determinants of the option grants may lead to an incomplete conclusion of the issue.

4.8. Conclusions and implications

This chapter analyzes how stock options are affecting the firm performance in

²⁹ Though there are several other reasons of these contentious results such as misuse of stock options that are discussed earlier in this chapter.

Japan. Nevertheless, stock options are comparatively new in Japan; the number of companies using this type of compensation is increasing every year. Most of the previous literature discusses the use of stock options with respect to the US companies. There are opposing views prevailing about the fundamental question of whether the option grants can really add value to a firm. Supporters of the incentive alignment idea advocate the use of stock options to induce managers for better performance (Jensen and Meckling, 1976; Milgrom and Robert, 1992; Mehran, 1995; Himmelberg et al., 1999; Core and Guay, 1999; Kedia and Mozumdar, 2002). The critics of stock options point towards the hidden costs of granting options and possibility of manipulating the accounting records, time and release of information to increase the wealth of executives at the cost of firm's intrinsic value (Yermack, 1995; Aboody and Kasznik, 2000; Carpenter and Remmers, 2001; Jenter, 2001; Meulbroek, 2001; Bens et al., 2002; Hall and Murphy, 2002). This analysis considers both of these contrary views to analyze the use of stock options in Japan, where companies are looking for a performance-based compensation system after the restructurings of traditional corporate governance system.

This analysis contributes to the research literature by adding the Japanese perspective in the debate of stock option grants and its effect on the firm performance. Specifically, the findings are helpful in understanding how stock options are helping Japanese companies to move from the traditional relationship-oriented style of management to the one that is more performance- and market-oriented. The analyses of multiple measures of firm performance indicate improvements in the firm performance following the option plan announcement. In the current business environment of Japan, option grants can serve as a useful tool to induce managers to take more notice of the

share prices. The results of this analysis also indicate that behavior of Japanese management following the announcement of option plans is not opportunistic in terms of changes in the executive ownership and dividend policy. Overall, Japanese evidence does not support the predictions of using stock options by the self-serving managers to enrich themselves at the cost of shareholders wealth. Additionally, an optimistic response from market suggests that investors and shareholders view stock options as an important tool to increase firm value

Evidence suggests that the performance gains from options increases with an increase in the option-grant intensity. However, firms can get maximum benefits from the options when option grants are used in association with the economic determinants of equity-based compensation. Executive ownership and bonuses also have a role to increase the firm performance. Therefore the combination of the option grants, executive ownership and bonuses may help to devise an optimal employment contract in the Japanese business environment.

To summarize the findings, it is important to note that stock options are provided to align the interests of management with the shareholders and thereby increase the firm value. Evidence suggests that the announcement of stock options in Japan does not necessarily means the manipulation of accounting earning to gain a temporary rise in the stock prices. On the other hand, our results indicate a positive and optimistic reaction from the stock market, investors and management, in response to the option plan announcement. With the transitions in the traditional corporate governance structure, option grants can help the companies to improve performance with a capital market

orientation and commitment to the shareholders, which is necessary to regain the profitability and international competitiveness.

In this regard, it is important to note that while the results of our analysis do not indicate the manipulations of accounting earning or misuse of stock options to maximize the executive gains in the Japanese companies, it is difficult to rule out the possibility of such manipulations. In Japanese business environment however, the legacy of traditional LTE philosophy might have helped to eliminate the opportunistic behavior at the cost of the firm's intrinsic value. Other unique institutional characteristics of the Japanese business environment such as cross-shareholdings and peer-pressure may also have a role to reduce the misuse of stock options.

4.9. Limitations

This section acknowledges some of the limitations associated with this analysis. The findings of this analysis about the misuse of options may have limitations. While we cannot observe the misuse of options on the basis of changes in board-member ownership and dividend policy, there are possibilities of other misuses, such as timing and type of information disclosures, investment decisions, use of insider information and influence of management on the board members etc. Future research may analyze these aspects to see the efficiency of option grants on increasing the pay-performance sensitivity.

This analysis also has limitations concerning the availability of data. As it is not possible to get the precise data about the amount of options granted to a single manager or employees in Japan, we use the aggregate firm level measures. While analyzing the performance consequences of option-based compensation the amount of executive pay

remains absent because of the non-availability of data. However, the scope of this analysis is concentrated on the impact of option grants on the firm performance, which is dealt adequately with the available data.

Chapter-five

Conclusions

5.1. Conclusions and implications

The findings of this analysis contribute to the research literature by providing new insights about the rise and fall of traditional systems and the changes in the Japanese management approach from a relationship-oriented style to the one that is market and performance oriented. Japanese corporations have traditionally enjoyed a higher degree of autonomy. This is due to the evolution of the Japanese business model, having features: main banks, cross-shareholdings and LTE. These features are interrelated and complement each other to maintain a structure in which management and labor work together in cooperation with the main banks. Within this structure, the traditional employment system of LTE and seniority-based compensation were established. This system has long been of interest to observers, especially during the 1980s, when it helped to explain the superior competitive performance of the Japanese companies. However, after the burst of the economic bubble, in 1990, this system began to alter profoundly by the decline in economic growth, decreasing role of the main banks, and a pressure to adopt a more open corporate governance system.

Chapter-two explains why and how the traditional system collapsed after the burst of the economic bubble in Japan. Research literature and popular press in Japan presents a lot of speculation about the end of traditional systems but lacks conclusive explanation about why the value contributions of the LTE system was decreased after the burst of the bubble economy. This chapter identifies the cost burdens associated with the system that can increase and start putting a negative effect on the firm's performance. Findings of this analysis explain that the costs to a company, concealed in the LTE system, remain hidden in the beginning years when the AET level of employees in a company is not very

high. However, the AET level increases gradually when the employees remain with the same company. Due to a steeper earning-tenure profile of employees under LTE contracts, the rate of the increase in pay is low in the beginning years, but it is high in the later years. Thus, the balance of employees' total contributions to a company against the total wages paid to the employees becomes negative when more employees are in the later half of their employment tenure. Similarly, advancement by seniority not only decreases the performance competition among the employees but also creates a jam-effect for promotions in the case of slow growth of a company.

Though the traditional system had an economic rationality to produce several advantages, this system needs to expand a significant amount of cost to maintain itself. In this respect, there are two kinds of cost; one is the cost of maintaining employment security, which is holding surplus workers because of the delay of employment adjustment. The other necessary cost to maintain the system is the additional payment to promoted workers. This cost is created by the seniority-based pay and promotion system. Thus, both the cost of maintaining the employment security and cost of additional payment to the promoted workers will be much higher when the company has a higher AET level than otherwise. While AET level continue to increase with the long presence of the LTE system, in an adverse situation, most of the disadvantages of the LTE are associated with an increased AET level in the company. These include high wage payments, low flexibility, decreased-performance competition due to job security, and the inability of a company to replace the workers in response to any technological changes.

Findings of this analysis contribute to the research literature by identifying the increasing AET level in a company as a representative index for the increases in the cost

burdens associated with the LTE system. A continuous addition of a significant number of new employees into the company can help to maintain a normal AET level. Thus, high growth and expansion are necessary for this system to produce positive results, which is not possible during the times of slow down in the economy. Though it is not easy to offset the cost burdens of traditional systems in the short-term, a gradual implementation of a performance-based system can be a first step towards the solution. Moreover, mechanism of corporate governance to support these changes in human resource management practices in Japan has begun to catch up during the last several years. There is an increasing trend of corporate governance based on market principles. Objective market indicators can be used to evaluate the performance of managers and employees, and one way to achieve that is to link their rewards to the company's share prices by giving them stock options.

Chapter-two addresses the issue of the increasing use of stock options as a performance-based compensation to replace the traditional employment system in Japan. There is an increasing trend towards using stock options both for executives and for employees after the amendments to the commercial code of Japan, in 1997. The use of stock options is especially important to analyze with reference to the transformations in the traditional employment practices and changing requirements of Japanese companies. Previous literature addresses the determinants of stock options on the basis of agency theory, mostly using a sample of US companies. However, the unique institutional characteristics of the Japanese business environment help to analyze the use of stock options for a variety of motives, requirements, and expectations. There are three important needs of Japanese companies, after the changes in the traditional business

model. First, companies want to create a balance between the interests of ‘insiders’ and ‘outsiders’ (which was inclined towards ‘insiders’ in the traditional system). In this regard, stock options can provide a mechanism to insure the investors and shareholders that they will recover the money they are investing. Second, after the collapse of the LTE system, companies need a mechanism to retain valuable human capital. The potential benefits of stock options such as attraction and retention of employees with the help of risk and vested exercise periods can facilitate this mechanism. Third, with a decreasing role of the main banks, companies need to access the capital market. Stock options may help to provide a capital market orientation by inducing the managers to take more notice of share prices. Thus, this analysis contributes to the compensation literature by providing a comprehensive analysis of the determinants and motives of option-based compensation on the basis of three different theories (i.e., agency theory, retention and sorting, and the financial and ownership structure of the firm).

Findings of this chapter support the use of stock options to align the interests of management with that of the shareholders. Similarly, evidence suggests that the use of stock options can provide better incentives when efforts of management can have a greater impact on the value of a firm. These findings are consistent with the agency theory presented in previous literature (e.g., Guay, 1999; Himmelberg et al., 1999). However, due to the limited ability of lower level employees to affect the total value of a firm, the agency theory cannot fully explain the use of stock options for employees. This analysis defines the use of employee stock options with the help of retention and sorting motives. Risk associated with the options helps to attract less risk-averse and more optimistic employees, or employees having the abilities and skills to increase the value of

a firm. Similarly, as employees are forced to the suboptimal early exercise of their options in case they leave the firm, the stock option based pay helps to retain the employees with the firm. An alternative way of retention can be a deferred cash payment. However, if labor market conditions change, the deferred cash payment can become insufficient for employees or expensive for the firm, but stock options can act as a substitute of deferred payment when labor market conditions are positively correlated with the firm's stock price. Granting options can also help with the retention because it loads the risk on the employees by increasing the cost of changing job for them. These findings can define the increasing use of stock options in the Japanese companies as a source of a retention mechanism.

Previous literature explains the use of stock options as a substitute to cash payments to overcome cash flow constraints (e.g., Matsunga et al., 1992; Yermack, 1995; Core and Guey, 1999). Findings of this analysis suggest that use of stock options as a substitute to cash payment can be an optimal choice when a company is able to attract the less risk-averse employees. These optimistic employees value the options greater than cash payments and the company can get a compensation discount on the wage payments.

Finally, we address the controversies in the research literature about the performance consequences of stock options. The findings suggest improvements both in the operating-performance measures and abnormal returns to Japanese companies, after the announcement of stock options. The results also observe the association between the option-grant intensity and performance of the adopting firms. The increase in the firm performance following the option plans indicates that stock options are able to fulfill the requirements of the Japanese companies after the changes in the traditional employment

structure. In this regard, the analysis of a reduced sample of the 1938 stock option announcements indicates the role of executive ownership and bonuses for better firm performance. Therefore, it is plausible to conclude that the combination of option grants with these two traditional instruments can help to define an optimal employment contract in the Japanese environment.

Another question addressed in this analysis is that whether it is possible for all the companies to get positive abnormal returns, simply, by granting more options or the option grants can be more useful in certain circumstances. The evidence suggests that option grants can help to get better firm performance when used in association with the determinants of equity-based compensation. It is more useful to adopt an option-based compensation when the companies have greater growth opportunities and higher risk to use the option grants for capitalizing the growth opportunities, and attracting the most suitable employees to work at the firm. Thus, stock options can produce greater performance gains in such companies than the others. These findings may help to explain one of the reasons why some empirical studies find contentious results about the performance consequences of option grants. Other reasons may include the misuse of options and possibility of manipulating the accounting record and information. However, the evidence from the Japanese sample does not show the opportunistic behavior on the part of management to increase the stock price provisionally.

While it is difficult to rule the possibility of these misuses completely, a legacy of long-term attachment with the firm and a sense of ownership in the Japanese management psychology might have helped to eliminate such manipulations. Therefore, it is plausible to conclude that with the unique characteristics of the Japanese business

environment and the increasing use of stock options, the Japanese business model may evolve into a shape that is different from the US model. Traditionally in Japanese companies, management and employees have a close association and both share a sense of ownership of the company. The positive impacts of this philosophy may help to rule out the opportunistic behavior in response to the option grants.

5.2. Limitations

This research has some limitations that need to be acknowledged here. First, this research addresses a wide area of changes in the compensation practices in relation to the restructurings of the corporate governance systems of Japanese companies. The critics of this research may question the depth of the analyses by focusing on a single issue. However, the changes in compensation practices are a part of the restructurings of the corporate governance system as whole in Japan. As stated in the beginning of this thesis, these changes are greatly interrelated and it may be misleading to ignore one part of it while focusing on the other. Thus, the purpose of using this holistic approach is to add strength to the analyses. Second, this research is conducted with a special reference to the changes in the traditional employment practices in Japanese companies after the burst of the bubble economy. Especially, the analysis of the LTE system is conducted with reference to the social and cultural values and conventional business practices in Japan. The findings may have limitations while generalizing for other business environments.

Third, though the findings of research suggest that Japanese firms are able to use stock options successfully to devise an optimal employment contract, it is not suggested merely to follow the US model. We present the current situation in Japanese companies

where the transitions from the traditional corporate governance structure are taking place. The experience of stock options has been successful to move from the traditional structure to a market-oriented structure. However, using certain type of employment contracts is a function of several other factors related to the general and economic environment. Future research may include the additional factors of Japanese business environment and management behavior to see the efficiency of stock options in Japanese companies. Similarly, the results of this research do not indicate that manipulations of accounting earning or misuse of stock options to maximize the executive gains in the Japanese companies. However, it is difficult to rule out the possibility of such manipulations. The possibility of such manipulations may increase when the management and employees lack long-term career loyalty with the firm. In Japan however, the legacy of traditional LTE might have helped to eliminate the opportunistic behavior at the cost of the firm's intrinsic value. Other unique institutional characteristics of the Japanese business environment such as cross-shareholdings and peer-pressure may also have a role to reduce the misuse of stock options.

Finally, this research concentrates on the human factor to explain the organizational rationality. Alternative logics of organizational rationality may also play their part to define the firm's performance.

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APPENDIX

List of the sampled companies of electronics industry in Japan

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| Aichi Electric Co., Ltd. | Fanuc Ltd. |
| Aiphone Co., Ltd. | FDK Ltd. |
| Alpine Electronics, Inc. | Foster Electric Co., Ltd. |
| Alps Electric Co., Ltd. | Fuji Electric Co., Ltd. |
| Anritsu Corp. | Fujitsu General Ltd. |
| Asti Corp. | Fujitsu Ltd. |
| Casio Computer Co., Ltd. | Funai Electric Co., Ltd. |
| Chino Corp. | Furuno Electric Co., Ltd. |
| Clarion Co., Ltd. | Futaba Corp. |
| CMK Corp. | Hamamatsu Photonics K. K. |
| Cosel Co., Ltd. | Hirose Electric Co., Ltd. |
| Daido Signal Co., Ltd. | Hitachi Koki Co., Ltd. |
| Daihen Corp. | Hitachi Kokusai Electric Inc. |
| Daishinku Corp. | Hitachi, Ltd. |
| Denki Kogyo Co., Ltd. | Hitachi Maxell Co., Ltd. |
| Densei-Lambda K.K. | Hitachi Medical Corp. |
| Denso Corp. | Hochiki Corp. |
| Denyo Co., Ltd. | Hokuriko Electric Industry Co., Ltd. |
| Diamond Electronics Engineering Co., Ltd. | Horiba, Ltd. |
| DKK Toa Corp. | Hosiden Corp. |
| Elna Co., Ltd. | Icom Inc. |
| Endo Lighting Corp. | Idec Izumi Corp. |
| Energy Support Corp. | Iwasaki Electric Co., Ltd. |
| Enplas Corp. | Iwatsu Electric Co., Ltd. |
| Espec Corp. | Japan Aviation Electronics Industry, Ltd. |

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|---|---------------------------------|
| Japan Digital Laboratory Co., Ltd. | Mitsubishi Electric Corp. |
| Japan Radio Co., Ltd. | Mitsui High-tech Inc. |
| Japan Servo Co., Ltd. | Mitsumi Electric Co., Ltd. |
| Japan Storage Battery Co., Ltd. | Morio Denki Co., Ltd. |
| JOEL Ltd. | Murata Mfg. Co., Ltd. |
| Kasuga Electric Works, Ltd. | NEC Corp. |
| Keyence Corp | NEC Infrontia Corp. |
| Kinseki Ltd. | NEC Tokin Corp. |
| Kitagawa Industries Co., Ltd. | Nichicon Corp. |
| KOA Corp. | Nidec Corp. |
| Koito Industries, Ltd. | Nihon Dempa Kogyo Co., Ltd. |
| Kokusen Denki Co., Ltd. | Nihon Inter Electronics Corp. |
| Kyocera Corp. | Nihon Kohden Corp. |
| Kyoei Sangyo Co., Ltd. | Nippon Avionics Co., Ltd. |
| Kyosan Electric Mfg. Co., Ltd. | Nippon Ceramics Co., Ltd. |
| Kyowa Electronics Instruments Co., Ltd. | Nippon Chemi-Con Corp. |
| Kyushu Matsushita Electric Co., Ltd. | Nippon Conlux Co., Ltd. |
| Mabuchi Motor Co., Ltd. | Nippon Tungsten Co., Ltd. |
| Makita Corp. | Nissan Electric Co., Ltd. |
| Maspro Denkoh corp. | Nitto Denko Corp. |
| Matsuo Electric Co., Ltd. | Nitto Electric Works, Ltd. |
| Matsushita Communication Industrial Co., Ltd. | Nohmi Bosai Ltd. |
| Matsushita Electric Industrial Co., Ltd. | Oki Electric Industry Co., Ltd. |
| Matsushita Electric Works, Ltd. | Omron Corp. |
| Matsushita Seiko Co., Ltd. | Origin Electric Co., Ltd. |
| Meidensha Corp. | Osaki Electric Co., Ltd. |
| Meisei Electric Co., Ltd. | Pioneer Corp. |
| Melco Inc. | Rohm Co., Ltd. |

Sanken Electric Co., Ltd.
Sanoh Industrial Co., Ltd.
Sanyo Denki Co., Ltd.
Sanyo Electric Co., Ltd.
Seiko Electric Co., Ltd.
Sharp Corp.
Shindengen Electric Mfg. Co., Ltd.
Shine-kobe Electric Machinery Co., Ltd.
Shinko Electric Co., Ltd.
Shinko Electric Industries Co., Ltd.
Shizuki Electric Co., Ltd.
SMK Corp.
Sony Corp.
SPC Electronics Corp.
Stanley Electric Co., Ltd.
Sumitomo Wiring Systems, Ltd.
Sunx Ltd.
Sysmex Corp.
Taiko Electric Works, Ltd.
Taiyo Yuden Co., Ltd.
Takaoka Electric Mfg. Co., Ltd.
Tamura Corp.
Tamura Electric works Ltd.
TDK Corp.
Teac Corp.
The Furukawa Battery Co., Ltd.
The Lead Co., Inc.
The Nippon Signal Co., Ltd.

TOA Corp.
Togami Electric Mfg. Co., Ltd.
Tokai Rika Co., Ltd.
Toko Electric Corp.
Toko Seiki Co., Ltd.
Toko, Inc.
Tokyo Denpa Co., Ltd.
Toshiba Corp.
Toshiba Tec Corp.
Toyo Communication Equipment Co., Ltd.
Toyo Electric Corp.
Toyo Electric Mfg. Co., Ltd.
Toyo Takasago Dry Battery Co., Ltd.
Twinbird Corp.
United Corp.
U-shin Ltd.
Ushio Inc.
Victor Company of Japan Ltd.
Yamataka Corp.
Yasukawa Electrical Corp.
YE Data Inc.
Yokogawa Electric Corp.
Yokowo Co., Ltd.
Zuken Inc.

