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INSULAR DECISION-MAKING IN THE BOARD ROOM: WHY BOARDS RETAIN AND HIRE SUB-STANDARD CEOs

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AUSTRALIA–JAPAN RESEARCH CENTRE

CRAWFORD SCHOOL OF ECONOMICS AND GOVERNMENT
THE AUSTRALIAN NATIONAL UNIVERSITY
CANBERRA ACT 0200

TELEPHONE: (61 2) 6125 3780
FACSIMILE: (61 2) 6125 8448
E-MAIL: AJRC@ANU.EDU.AU
URL: [HTTP://WWW.CRAWFORD.ANU.EDU.AU](http://WWW.CRAWFORD.ANU.EDU.AU)

INSULAR DECISION-MAKING IN THE BOARD ROOM: WHY BOARDS RETAIN AND HIRE SUB-STANDARD CEOs

It is widely believed that corporate boards are overly reluctant to fire their CEOs. The conventional explanation for retaining a CEO regardless of his/her talent is that a CEO chooses the board members and has the power to fire them. However, very few studies have investigated how a new CEO is chosen. This paper explores an unexamined cause of board reluctance in removing a CEO: the incentive to minimize the leakage from the decision-makers' future surplus. I argue that this same logic provides the theoretical explanation for how a new CEO is chosen for both voluntary and forced CEO replacements. I show that this incentive of the incumbent board and CEO often departs from the shareholders' interest. In short, if the net surplus of the incumbent board and CEO is expected to be larger under an incumbent sub-standard CEO, or under an internal candidate rather than an external candidate, then they retain the incumbent sub-standard CEO or promote an internal CEO candidate, even though the expected corporate profit generated by appointing an external candidate is likely to have been greater.

Keywords: CEO Succession Policy; Board's Monitoring; Board Composition; CEO's Firm Specific Knowledge.

JEL Codes: D79, G30, K22, L29, L22.

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The Australian National University, Canberra, ACT Australia.

Email: meg.sato@anu.edu.au

Tel: +61.(0)2.6125.7247.

1 Introduction

A firm's board of directors is responsible for monitoring management on behalf of the shareholders. A Chief Executive Officer (CEO) is assigned to perform in a way to maximise the corporate profit to meet the shareholders' expectations. However, a CEO's performance does not always meet the shareholders' expectations. In such a case, the job of the board is to replace the sub-standard CEO with a new CEO who is more talented and thereby enhancing the corporate profit. However, it is widely believed that corporate

boards are inert because they are slow to remove ineffective CEOs. Of parallel importance, the board as well as an incumbent CEO is responsible in choosing a new CEO in the case of voluntary CEO replacement. That is, the shareholders expect the board to hire a new CEO from inside or outside the current board based on the talent of a candidate. Despite this expectation, CEO is often an internally promoted candidate, and this may be a case of nepotism, for example, s/he could be a CEO's offspring.

This paper attempts to provide a theoretical rationale for the actions on the part of the board of directors that depart from shareholders' interests. The starting point for this research is to investigate whether there is an advantage for the incumbent board members themselves to be gained by retaining an existing sub-standard CEO or promoting an internal CEO candidate, even though the expected corporate profit generated by appointing an external candidate is likely to have been greater. In other words, in order to understand the deliberate reason that leads the board to take these actions, I extend the model developed by Hermalin and Weisbach (1998) (whose model is discussed in section two of this paper) to focus on negotiations held by the incumbent board and CEO in an insular board room.

The conventional explanations for board reluctance in removing a sub-standard CEO tend to locate the reasons for these actions as a means of securing the board's interests/jobs: the CEO picks the board members and hence it is costly for the board whose members are less independent of the CEO to fire the incumbent CEO (Hermalin and Weisbach 1998); the directors fear being ousted from the board when they do not succeed in replacing the CEO and hence they do not always take initiatives in removing the CEO (Warther 1998); CEOs take deliberate actions to create specific human capital that makes it costly to replace them (Shleifer and Vishny 1989); and the board has dual roles to monitor and advise the CEO, and the effectiveness of its monitoring depends on the information environment of outside directors (Raheja 2005, Adams and Ferreira 2007, and Harris and Raviv 2008). Very few studies have attempted to develop a theoretical model of how a new CEO is chosen. (Raheja 2005 is discussed in section two of this paper.) I am going to show that the incentive to minimise the leakage from the decision-makers' future surplus contributes to the reluctance of the board for the removal of an incumbent CEO and the choice regarding the appointment of a new CEO.

This is analysed in the framework using Nash bargaining game between the two players: the incumbent CEO and the board of directors.¹ The board of directors is treated as a single player, and hence, there is no free-rider problem. The profit of the firm is dependent on CEO's talent. The players sign a contract determined by Nash bargaining. They bargain over three topics to be written on the contract: the wage of the incumbent CEO, the amount of money the board is willing to pay to the specialist(s) who review(s)

the incumbent CEO's conduct (which affects the monitoring level), and the succession policy of whether to hire the next CEO from inside the board or outside the board. The term monitoring is used to mean learning CEO's talent by reviewing his/her conduct.² Monitoring level can be interpreted in several ways.³ In this paper, I interpret it as the probability of the board obtaining informative details about the CEO's talent from the specialist(s) they hire. (All board directors receive this information equally, and hence it is assumed that there is no information asymmetry among directors.) Thus, when the incumbent board and CEO determine the amount they pay to the specialist(s), it can be regarded that they are determining the monitoring level. The succession policy and the monitoring level need not necessarily be determined at the same time, but for simplicity, these three topics are determined together. That is, I show in the Appendix A.3 that the same result is obtained (and by the same logic) when the board alone re-determines the succession policy after the incumbent CEO's tenure is terminated. Thus, it can be considered that the board is not making commitment to the succession policy determined prior to forced CEO replacement.

The incumbent CEO is perceived to have acquired firm-specific knowledge which makes the incumbent CEO more advantageous than potential CEOs in two aspects; that is, it gives the incumbent CEO, a bargaining power to negotiate his/her own wage⁴; and a rent.⁵ The more heterogeneous the industry is, the more valuable the human capital of the CEO's position (Parrino (1997)), and thus the higher the rent of the incumbent CEO. The bargaining surplus includes the rent generated by the incumbent CEO's firm-specific knowledge, but it is not the rent itself. The more valuable the CEO's human capital to the company, the larger the rent generated by the human capital, and as a result, the larger the bargaining surplus.

When the two incumbent players bargain over these three topics, the decision-making is done in a way to maximise only the incumbents' joint expected payoffs, which does not internalise the welfare of the potential newcomer to the management group (that is, a group of the board and CEO). Unlike the topics which do not involve changes in the members of management group, such as, the decisions regarding the amount or choice of the investment or the issuance of bonds or stock options, the decision that is related to the firing of the incumbent CEO, as well as the decision about CEO succession policy for both voluntary and forced CEO appointments, implies a member change to the management group. However, the incumbent decision-makers' (the incumbent management group's) concern is to maximise 'their' own bargaining surplus. Thus, despite the fact that there are three players that may be affected by Nash bargaining, the two incumbent players who do the bargaining do not internalise the potential newcomer's expected welfare (which is considered as a leakage from the expected joint welfare of the incumbent board and CEO),

thus creating an inefficiency.⁶

One theoretical contribution of this paper is in finding a new cause of undesirable CEO retention. That is, due to the non-internalisation of the potential newcomer's welfare, the equilibrium monitoring level departs from the optimum monitoring level of the corporation, thus too often resulting in CEO retention when CEO turnover is in fact more optimal for the corporation. More specifically, the monitoring level is determined at the level that reduces the probability of having leakage. Another important contribution is in finding that the non-internalisation of the potential newcomer's welfare affects the choice regarding the appointment of a new CEO. That is, the succession policy is chosen not only by comparing the expected profits brought to the firm by the potential CEO's talent (s/he could be from either inside or outside the board), but also by comparing the amount of leakages to the welfare of the incumbent board and CEO who are determining a new CEO. Hence, the equilibrium succession policy may depart from the optimum succession policy, the latter of which is the optimum from the shareholders' perspective.

This paper is based on the following empirical observations. Parrino (1997) reports that CEO replacement is more frequently observed in homogeneous industries than in heterogeneous industries, for it is easier for the board to find a candidate with similar human capital required for the CEO's position. Berry et al. (2006) also focus on CEO's human capital and find that diversified firms choose their CEOs from a more talented labour pool than focused firms because CEOs of such companies need to be competent. This paper may give a new implication to the results of Parrino (1997) and Berry et al. (2006). That is, in heterogeneous industries, CEO candidates do not have the firm-specific knowledge one firm needs, and hence the firm will incur search cost if it decides to bring an outside candidate for a new CEO's position. This means the leakage from the bargaining surplus may become larger than the additional profit an outside candidate can bring (generated from his/her talent) to the firm, and hence the firm promotes inside directors to the new CEO's position. Similarly, in diversified firms, it is difficult to find appropriate managers. Thus, the incumbent board trades off the leakage from the bargaining surplus and the additional profit brought to the firm by a new CEO (who may be 'talented'), and if it considers the former to be larger than the latter, it promotes an insider to the CEO's post.

Further, there are many studies on the CEO succession policy, and results are mixed. Some find that internal promotion is more frequently observed, while others find outside recruiting more common under certain conditions. See Agrawal et al (2006), Ocasio (1999), Clutterbuck (1998), Borokhovich et al. (1996). The theory developed in this paper may explain why boards sometimes hire from outside and why they sometimes promote from inside, and hence bridges the gap in empirical results.

The insight this paper provides goes further into the relation of board composition and firm performance. Yermack (1996) and Agrawal and Knoeber (1996) find no relationship between firm performance and board composition. In this paper, whether the board has inside directors or outside directors, as long as they all participate in decision making, they all share the common incentive: to minimise the leakage from the group utility. Thus, regardless of the characteristics of the board, the incumbent board members have the incentive to pursue their own utility maximisation which often results in retaining of the sub-standard CEO or hiring less talented CEO. In such cases, the firm's performance stays low or unimproved, since the profit of the firm is dependent on the CEO's talent. In short, corporate value/firm performance is irrelevant to the board composition, and thus, the theoretical finding of this paper may explain the results of Yermack (1996) and Agrawal and Knoeber (1996).

The remainder of the paper is organised as follows. The next section of the paper discusses relevant literature. Section three develops a theoretical model and discusses how non-internalisation of the potential newcomer to the corporate board affects CEO's tenure and decisions on CEO succession policy. Section four discusses an extension of the model developed in section three. Section five concludes.

2 Literature Review

There are several works in the literature that theoretically discuss the cause of the board's inertia in CEO replacement.⁷ Some of them specify the cause and further discuss it in relation to board composition. However, there has not been any literature that argues utility loss for the group (non-internalisation of the potential newcomer's welfare) as a cause of CEO retention.⁸

In Hermalin and Weisbach (1998), the incumbent board (treated as a single player) and CEO determine the wage of the incumbent CEO and a new director to be appointed to the board through Nash bargaining. This new board with the new director can be regarded as a different board from the incumbent board. Then, after the Nash bargaining, this new board monitors the incumbent CEO.⁹ Thus, the incumbent CEO is willing to compromise his/her wage in exchange for appointing a new director who is likely to be loyal to him/her. Their main finding is that when the CEO is involved in appointing a new director, someone who is less independent from the CEO is appointed and weakens board monitoring of the CEO, resulting in CEO retention. They measure the cost of monitoring with notation k : the board's lack of independence, where it changes from k_0 (exogenously given) to k_1 (endogenously determined), ($k_0 < k_1$), as the board members change. This k can be interpreted as a measure of comradeship or allegiance to the CEO,

and they argue that the higher k is (or the stronger the comradeship or allegiance to the CEO is), the less the board monitors the incumbent CEO. In short, the monitoring level and the board's measure of lack of independence have one-to-one correspondence, and the incumbent board and the incumbent CEO can be regarded as players that are determining the monitoring level. Thus, the incumbent CEO stays in a company for more than s /he deserves according to his/her talent.

Raheja (2005) develops an interesting model in which she examines both the board's weak monitoring and a new CEO appointment. She finds that lack of knowledge or information causes a delay in the board's monitoring and hence the retention of sub-standard CEOs. She develops a model in which inside directors and outside directors face asymmetric information about a project implemented by the CEO. In her paper, the insiders are better informed about management than outsiders as argued by Fama and Jensen (1983). The insiders are successor CEO candidates themselves. They have the expertise knowledge in management and know the quality of the project proposed by the CEO, whereas the outsiders cannot tell the quality of the proposed project unless insiders share their superior information with them. When the information is shared, the outsiders decide to vote for or against the proposed project, but to vote against it requires verification that their decision is correct, and hence, monitoring (verifying) is performed by outsiders. It is assumed that monitoring is so costly that the outsiders do not monitor without the insiders' information. This implies that in order for boards to function as monitoring devices, the board must be comprised of both inside and outside directors. The study by Raheja (2005) may seem somewhat similar to this paper, for it considers both the monitoring levels and the CEO succession policy. In her paper, when outsiders verify the information, the next CEO is voted from one of the insiders who had revealed the information. However, the CEO succession policy itself is not completely determined endogenously; specifically, the insiders have the choice of whether or not to disclose the information about where to hire the successor, though, this given as a rule when it comes to the stage of appointment. In my model, the CEO successor himself/herself is endogenously determined in the game through maximising the utilities of all incumbent members. Despite the differences in our approaches, Raheja (2005), Hermalin (2005), and this paper are thus far the only studies that have attempted to endogenously choose the successor CEO.

3 Model

3.1 Basic Structure

In this section, I show that removing the incumbent CEO and appointing a new CEO

induce a member change in the management group, and this induces a certain utility loss (or ‘leakage’) to the incumbent members’ whole utility. This deprives them of the incentive to remove (or monitor) the incumbent CEO to avoid such ‘leakage.’ I also show that the type of ‘leakage’ varies according to the succession policy (inside promotion or outside recruiting), and the incumbents prefer the succession policy with the smaller amount of leakage, holding other things equal.

Players

There are two players, the incumbent board and CEO. I use the term ‘board’ to refer to n directors who act as one player. All n directors act as one player, the board, and hence there is no free-rider problem.¹⁰ The passive player is the new CEO who is either promoted from the incumbent board or recruited from outside the incumbent board.

Strategies

The incumbent board and CEO bargain over the choice of a new CEO, the incumbent CEO’s wage w , and the amount $d(p)$ they pay to the specialist (such as internal auditors hired from outside the firm) who reviews the CEO’s conduct and reports it to the board. Then, the board updates its prior distribution about the incumbent CEO’s talent (CEO’s true talent is either high (H) or low (L) and no player knows this): the board discovers the incumbent CEO’s talent is likely to be H with probability p ; if the board discovers the incumbent CEO’s talent is likely to be L , then the incumbent CEO is replaced by the new CEO; otherwise, the incumbent CEO stays till the end of the game. CEO’s true talent (high (H) or low (L)) is not known to any player, but the incumbent CEO is perceived to have higher talent as compared to any other potential CEOs at the beginning of the stage.

Payoffs

The incumbent CEO receives endogenously determined wage w , and non-contractable private benefit b (i.e. reputation which will give him/her more bargaining power in the future) if s/he is retained to the last stage. The new CEO receives the starting wage. The board receives a ratio \bar{P} from the corporate profit less monitoring cost less payment to the incumbent CEO and the new CEO.

Corporate profit is dependent on the distribution of the CEO’s talent. For simplicity, I assume that the board obtains \bar{P} from the firm profit. That is, the expected profit of the firm is denoted by \bar{X}_i , where i denotes CEO’s true talent, which is either high (H) or low (L). Then the board obtains $\pi = \rho \left[\alpha \bar{X}_H + (1-\alpha) \bar{X}_L \right]$, where α is the probability of the CEO’s talent being high, and it is determined through the Bayes’

update as described in the Appendix A.4. If the incumbent CEO serves to the end without his/her prior talent being updated by monitoring (that is, α remains unchanged), the board is expected to receive π_I ; if the incumbent CEO is monitored and perceived to have high talent, α is updated and the board is expected to receive π_H ; if the incumbent CEO is monitored and perceived to have low talent, α is updated and the board will receive π_L but this is not realised in the equilibrium, for such a CEO would be fired. If the new CEO is hired after the dismissal of the incumbent CEO, and is recruited from the outside, the board is expected to receive $\pi_{\hat{N}}$, whereas it is expected to receive π_N when promoted from inside the incumbent board. The relations among expected profits to the board are induced by the Bayes' update as described in the Appendix A.4, and they are $\pi_H > \pi_I > \pi_L$, $\pi_H > \pi_{\hat{N}} > \pi_L$, $\pi_H > \pi_N > \pi_L$. I assume $\pi_I > \pi_{\hat{N}}$ and $\pi_I > \pi_N$. The difference between $\pi_{\hat{N}}$ and π_N comes from whether the new CEO is hired from outside the incumbent board, or whether s/he is promoted from inside the board. I do not specify the relation between $\pi_{\hat{N}}$ and π_N , since there are both merits and demerits for both types of potential CEOs.¹¹

3.2 Timing

There are four stages. The basic structure of the interaction between the board and the incumbent CEO is followed from Hermalin and Weisbach (1998).¹²

First stage: The firm has one incumbent CEO and the board. All the incumbent members Nash bargain over the contract regarding the wage of the incumbent CEO denoted w , the amount $d(p)$, which they pay to the specialist to monitoring the CEO (where, p is equal to the intensity of monitoring by the specialist and this is the probability that the board obtains informative information about the CEO), and the succession policy of whether to hire a new CEO from outside the incumbent board or to promote one of the incumbent directors. The prior distribution about incumbent CEO's talent being H is assumed to be more than $1/2$, where any other potential CEOs' prior distribution about their talents are assumed to be precisely $1/2$ for being H .¹³

Second stage: The specialist collects information about CEO's conduct (monitors) and gives it to the board of directors. Based on the information provided by the specialist, the board updates the prior distribution of the incumbent CEO's talent. With probability p , the board receives an informative information to update its belief(distribution) about the talent of the incumbent CEO. That is, with probability p , it receives the information of $\{y_G, y_B\}$. With probability $(1-p)$, it receives non informative information y_I . The larger p is, the higher the probability of obtaining additional information about the CEO's talent. Moreover, $q = \Pr(y_G | \{y_G, y_B\})$, and $1-q = \Pr(y_B | \{y_G, y_B\})$. If the board receives y_G , it updates its belief(distribution) about the incumbent CEO being

likely to have high talent. If the board receives y_B , it updates him/her as being likely to have low talent.

Third stage: The board retains or replaces the incumbent CEO based on the information. It retains the incumbent CEO when y_G is observed, but also with probability $(1-p)$, there is no choice but to retain him/her. It fires the incumbent CEO when it receives y_B , and it hires a new CEO from outside or inside the board based on the decision made in the first stage. (All the remaining directors may renegotiate the succession policy after the incumbent CEO has been fired, but even if they renegotiate the succession policy, the same conclusion as determined in the first stage is derived.¹⁴ The proof is in Appendix A.3.

Fourth stage: Production is made and all the players receive their payouts.

3.3 The Players' Objectives

The number of directors (n) on the board, the non-contractable private benefit b the CEO who is serving at the last stage of the game receives, and the wages to the newly hired CEO ($w_{\hat{N}}$ if recruited from outside, and w_N if recruited from inside the incumbent board), are exogenously given.¹⁵

The incumbent CEO's expected utility is expressed as:

$$[pq + (1-p)]b + w \tag{1}$$

for s/he receives the wage w determined in the negotiation, but the non-contractable private benefit b is only given when s/he is retained to the end of the game. She is retained when the specialist gives the board y_G (occurs with probability pq) or y_I (occurs with probability $(1-p)$).¹⁶ In other words, if the incumbent CEO is dismissed prior to the last stage, s/he will not obtain b , but instead, the newly hired CEO will obtain it.

The expected utility of the board (this is for the n incumbent directors) differs by where they choose the new CEO from.

If the new CEO is to be hired from outside the incumbent board members is expressed as¹⁷:

$$npq \frac{\pi_H}{n} + np(1-q) \frac{\pi_{\hat{N}} - w_{\hat{N}}}{n} + n(1-p) \frac{\pi_I}{n} - d(p) - w. \tag{2}$$

The first and the second term of (2), $np \left[q \frac{\pi_H}{n} + (1-q) \frac{\pi_{\hat{N}} - w_{\hat{N}}}{n} \right]$, is the expected utility to the board when it receives an informative information about the incumbent CEO; specifically, n is the number of directors serving on the board and p is the probability that the directors obtain informative information about the incumbent CEO. With prob-

ability pq , the information y_G is given to the board. Thus, each director on the board will receive $\frac{\pi_H}{n}$. With probability $p(1-q)$, the information y_B is given to the board, and hence the board replaces the incumbent CEO. Then, each director on the board will receive $\frac{\pi_{\hat{N}} - w_{\hat{N}}}{n}$ each. The wage $w_{\hat{N}}$ is paid to the new CEO who will be hired from outside the incumbent board. The new CEO does not have any bargaining power, and hence the amount of this wage is assumed to be determined in the market. The new CEO, if hired with probability $p(1-q)$, will also obtain the non-contractable private benefit b , but this is not internalised in either the board utility or the incumbent CEO's utility. The third term, $n(1-p)\frac{\pi_L}{n}$, is the utility of the board when it receives the non-informative signal about the incumbent CEO, and thus s/he is retained. The fourth term $d(p)$, where $p \in [0,1)$, is the cost of monitoring for the board which is a strictly increasing, strictly convex, twice continuously differentiable function. I assume $d'(0) = 0$, and $d'(p) \rightarrow \infty$ as $p \rightarrow 1$, which derives interior solutions. The fifth term, w , is the amount of wage paid to the incumbent CEO.

On the other hand, the expected utility of the board is expressed as the following if the new CEO is going to be recruited from inside the incumbent board members¹⁸:

$$npq \frac{\pi_H}{n} + p(1-q) \left[(n-1) \frac{\pi_N - w_N}{n} + b + w_N \right] + n(1-p) \frac{\pi_L}{n} - d(p) - w. \quad (3)$$

I assume each inside director has an equal chance of being promoted to the new CEO. This is reflected in the second term of (3):

$p(1-q) \left[(n-1) \frac{\pi_N - w_N}{n} + b + w_N \right] = p(1-q)n \left[\frac{(n-1)}{n} \frac{(\pi_N - w_N)}{n} + \frac{1}{n} (b + w_N) \right]$; that is, when the board obtains the informative information with probability p , and it updated its belief about the incumbent CEO's talent to be low with probability $(1-q)$, one of the inside directors is promoted to a new CEO and the remaining directors stay on the board. That is, w_N will be paid to the new CEO who was originally the member of the board, so the remaining $n-1$ directors each receive $\frac{\pi_N - w_N}{n}$. From the perspective of the newly promoted CEO, s/he will receive the wage w_N and the private benefit b , but will not receive the pay as a plain director (which is $\frac{\pi_N - w_N}{n}$ per director). The payment of $\frac{\pi_N - w_N}{n}$ will be paid to the newly hired director to refill the vacancy in the board.¹⁹

This new director's expected utility is not internalised in either the expected utility of the current board or the expected utility of the incumbent CEO. Note that the expected

payment of $w_N + b$ to the new CEO (a former inside director) is internalised, for s/he is the original incumbent member. The other terms are as (2).

3.4 Analysis on Board Decision-making: Succession Policy and CEO Retention

In this subsection, I show that both incumbent players in this model have the incentives to maximise their joint expected utility when making decisions. This is because the players' utilities are transferable, and they Nash bargain. Thus, maximising the joint expected utility expands the feasible set. However, there are inefficiencies when they are not internalising the expected utilities of potential newcomers who might join the board in the future.

The Choice of a Successor CEO and Monitoring Levels

In what follows, I discuss how monitoring levels and succession policies are determined when the incumbent board members are not internalising the potential newcomer's welfare.

Nash product is either

$$V_o \equiv \left\{ p \left[q\pi_H + (1-q)(\pi_{\hat{N}} - w_{\hat{N}}) \right] + (1-p)\pi_I - d(p) - w - \theta_B \right\} \times \{ [pq + (1-p)]b + w - \theta_C \}, \quad (4)$$

or

$$V_i \equiv \left\{ pq\pi_H + p(1-q) \left[(n-1) \frac{(\pi_N - w_N)}{n} + b + w_N \right] + (1-p)\pi_I - d(p) - w - \theta_B \right\} \times \{ [pq + (1-p)]b + w - \theta_C \}. \quad (5)$$

The difference of (4) and (5) comes from the succession policy. Nash product (4) is when the new CEO is going to be hired from outside the board, while (5) is when the new CEO is going to be internally promoted. The threat points are expressed as (θ_B, θ_C) for (4) and (5). That is, if the negotiation breaks down, the board will receive θ_B and the incumbent CEO will receive θ_C .

Given the succession policy, the players determine the optimum monitoring level p^* that expands the frontier as outwards as possible. Note that Nash bargaining frontier is linear in forty-five degrees. (See the proof of Proposition 2 in the Appendix A.1 and A.2.) Hence, when comparing the two succession policies, the board determines to adopt a succession policy with higher frontier.²⁰ To be more specific, the monitoring level is determined at the level that shifts the bargaining frontier as outward as possible, where the ceiling of the frontier differs according to the succession policy. Thus, the policy that will expand the frontier further outwards than the other policy will be chosen.²¹ However, one policy is not always better than the other policy (for example, outside recruiting is not always better than inside recruiting, and vice versa). Whether or not one policy is more

desirable than the other depends on the expected profits brought to the firm by the new CEO and the amount of ‘leakage’ that occurs - an amount that varies according to different situations. As shown in the Appendix A.1 and A.2, the frontier can be expressed as the sum of the board expected utility and the incumbent CEO's expected utility.

The joint expected utility of the incumbent members when the new CEO is to be hired from outside the incumbent board is expressed as

$$pq\pi_H + p(1-q)(\pi_{\hat{N}} - w_{\hat{N}}) + (1-p)\pi_I - d(p) + pq + (1-p)b, \quad (6)$$

which is the addition of (1) and (2). The joint expected utility of the incumbent members when one of the inside directors is promoted to be the new CEO is expressed as

$$pq\pi_H + p(1-q)\left[(n-1)\frac{\pi_N - w_N}{n} + b + w_N\right] + (1-p)\pi_I - d(p) + [pq + (1-p)b], \quad (7)$$

which is the addition of (1) and (3).

In comparing the above two expressions, (6)>(7) holds for all p , when

$$\pi_{\hat{N}} - w_{\hat{N}} - \left[\pi_N - w_N - \frac{1}{n}(\pi_N - w_N) + (b + w_N) \right] > 0,$$

and (6)<(7) holds for all p , when

$$\pi_{\hat{N}} - w_{\hat{N}} - \left[\pi_N - w_N - \frac{1}{n}(\pi_N - w_N) + (b + w_N) \right] < 0.$$

In other words, the sufficient condition to hire a CEO from outside the board is:

$$\pi_{\hat{N}} + b - (w_{\hat{N}} + b) > \pi_N + b - \frac{1}{n}(\pi_N - w_N), \quad (8)$$

and the sufficient condition to promote inside directors to be CEO is expressed as:

$$\pi_{\hat{N}} + b - (w_{\hat{N}} + b) < \pi_N + b - \frac{1}{n}(\pi_N - w_N). \quad (9)$$

The possible gross expected payoff to the incumbent players is $\pi_{\hat{N}} + b$, if the new CEO is recruited from outside the incumbent board, and it is $\pi_N + b$, if the new CEO is recruited from inside the incumbent board. The leakage to the newcomer is expressed as $(w_{\hat{N}} + b)$ for the former, while it is $\frac{1}{n}(\pi_N - w_N)$ for the latter. Recall that the newly inside promoted CEO is the original incumbent board member, so any expected payment s/he will receive is not considered as a ‘leakage.’

Given the above argument, the incumbents' decision to promote an inside director or recruit from outside is determined by comparing the amount of difference between the leakages and the amount of difference between the expected profits brought to the firm

by the potential CEOs. That is, even if the expected profit brought to the board by the new outside CEO is higher than that brought by the inside new CEO ($\pi_{\hat{N}} > \pi_N$), if a wage to the outside new CEO and a non-contractable private benefit are too high, the board has an incentive to promote the inside director. This trade-off leads to the following Proposition.

Proposition 1

The incumbents decide to recruit from outside the incumbent board when (8) holds, and to promote one of the inside directors as a successor CEO when (9) holds.

This Proposition implies that if the non-contractable private benefit is considered to be large, the incumbent decision-makers do not want to lose this to the newcomer, and hence they have the incentive to let one of the inside directors become the CEO, unless the expected profit brought to the board by the outside CEO is extremely high. At the same time, it implies that if the wage that will be paid to the outside CEO is high, the incumbents have the incentive to promote the inside director to the new CEO, unless the expected profit brought to the board by the outside CEO is extremely high.

An interesting case is when the board promotes one of the inside directors to the post even when there is a potential CEO outside the board who is expected to bring a higher net profit to the firm. ($\pi_{\hat{N}} > \pi_N$ with not too big difference). This may happen in companies that are or started out as family businesses.²²

For example, consider a case in which all the inside directors are nepotism, and the entrepreneur or the CEO could be the only one who is talented in management. In such a case, when the incumbent CEO retires, hiring a new CEO from outside the current firm might be better than appointing a less-than-adequate insider as the new CEO. However, as is often observed in practice, the CEO's offspring may succeed in the post.

Corollary 1

The board may promote an insider to the post of CEO even when there exist outside potential CEOs who are expected to be more talented than any of the inside potential CEOs.

The above Corollary holds unless $\pi_{\hat{N}}$ is much larger than π_N , so as to alter the inequality of (9).

Next, I show the monitoring levels determined unique to the succession policy.

Proposition 2

The monitoring levels are determined unique to the succession policy and they are expressed as follows.

1.If the board determines to promote one of the inside incumbent directors, it is:

$$d'(p) = q\pi_H + (1-q)\pi_N - \pi_I - (1-q)\frac{1}{n}(\pi_N - w_N). \quad (10)$$

2.If the board determines to recruit from outside the incumbent board members, it is:

$$d'(p) = q\pi_H + (1-q)\pi_{\hat{N}} - \pi_I - (1-q)(b + w_{\hat{N}}). \quad (11)$$

This proposition suggests that due to the non-internalisation of the potential new-comer's welfare, the equilibrium monitoring level is attenuated by the amount of 'leakages,' thus too often resulting in CEO retention when CEO turnover is in fact more optimal for the corporation. Since monitoring levels are the proxies for CEO retentions in this model, CEO's retention policy is determined at the level that reduces the probability of having 'leakage.'

These monitoring levels are determined as follows. The monitoring levels are determined at the level that shifts the bargaining frontier as outward as possible, given the succession policy. The 'leakage' that the incumbent board incurs by having CEO replacement is reflected in the last term of both (10) and (11). That is, with probability $(1-q)$, the incumbent CEO is fired, and a newcomer is hired and $\frac{\pi_N - w_N}{n}$ or $(b + w_{\hat{N}})$ will not be given to one of the incumbents. Recall that when one of the inside directors is promoted to be the new CEO, the board hires a new director to maintain the number of directors at n . Thus the payment of $\frac{\pi_N - w_N}{n}$ is given to this new director, and this is considered as a 'leakage' from the perspective of the incumbent board members, whereas if the board brings a new CEO from outside the incumbent board, the new CEO is the newcomer and the wage $w_{\hat{N}}$ and the benefit b s/he receives in place of the incumbent CEO is the 'leakage.' As for (10), the higher the wage w_N to the new CEO, the more the board monitors. This is because the inside directors have the incentive to become the new CEO themselves. However, usually $\pi_N - w_N > 0$ holds, and thus, monitoring levels are attenuated for both (10) and (11) by the 'leakages.'

Corollary 2

Regardless of the board composition, the board has an incentive to retain the incumbent CEO who is less talented than potential CEOs. Thus board composition does not affect firm performance.

I have shown that the expected utility to the board differs depending on the succes-

sion policy it chooses. The expected utility of the board under the outside recruiting policy (which is (2)) can be considered as the expected utility of the board that consists solely of outside directors who have no incentive to become the CEO of the company s/he is serving as an ‘outside director.’ (See Borokhovich et al [1996] for a positive relationship between the percentage of outside directors and the frequency of outside CEO succession.) On the other hand, the expected utility of the board under the internal promotion policy (which is (3)) can be interpreted as the expected utility of the board which is solely composed of inside directors. Therefore, regardless of the board composition, the board has an incentive to retain the incumbent CEO. I also note that even if the board had both insiders and outsiders (defined from their incentives to become the successor CEO) at the same time, the substantial result is the same.²³

4. Extension: Internalisation of the Newcomer’s Welfare

4.1 *Social Surplus Maximisation*

Below I show that when the incumbent members do internalise the newcomer's welfare (that is, they ‘must’ internalise the newcomer’s welfare), the monitoring level is higher than the equilibrium monitoring levels determined by the incumbent board and CEO, and the succession policy equals the optimum succession policy for the shareholders.

The optimum succession policy is to hire a potential CEO who is expected to bring a higher net expected profit to the board:

$$\max \{ \pi_{\hat{N}} - w_{\hat{N}}, \pi_N - w_N \} \quad (12)$$

This is the optimum for all three players (the incumbent CEO, the board, and the potential newcomers). If, $w_{\hat{N}} = w_N$, (12) is expressed as:

$$\max \{ \pi_{\hat{N}}, \pi_N \} \quad (13)$$

This equals the optimum from the shareholders’ perspective as well.

Because the players’ utilities are transferable, and they all Nash bargain, the optimum monitoring level is determined to maximise the joint expected utility of all players, including the incumbent members and those newcomers (a new CEO if recruited from outside and a new director if promoted from inside the board) who may be appointed to the board after voluntary or forced CEO departure. The joint expected utility of such case is expressed as:

$$pq\pi_H + p(1-q)\max\{\pi_{\hat{N}}, \pi_N\} + (1-p)\pi_I - d(p) + b. \quad (14)$$

This expression holds when w_N is not necessarily equal to $w_{\hat{N}}$. See Appendix A.5 for the proof. Taking the first-order condition with respect to p induces the optimum level of monitoring:

$$d'(p) = q\pi_H + (1-q)\max\{\pi_{\hat{N}}, \pi_N\} - \pi_I. \quad (15)$$

Equation (15) shows that when the incumbent board members internalise the expected utility of future newcomers to the board, the board monitoring level is not attenuated by ‘leakage’ which is either $w_{\hat{N}}$ or $\frac{\pi_N - w_N}{n}$.

4.2 Re-employment of the Retired CEO

Theoretically, the social surplus maximisation described in section 4.1 is attained if there is no newcomer to the incumbent management group. If there is no newcomer on the board, the monitoring level becomes more intense and the probability of removing an inefficient CEO increases. One way to achieve this is to re-employ the retired CEO to the director’s post under an internal promotion system when $\pi_{\hat{N}} > \pi_N$ holds. That is, under an internal promotion system, if the incumbent CEO departs, one of the directors becomes the CEO, and then to maintain the board size at n , a new director is hired as in Japanese companies. The idea is to re-employ the departed CEO (who was participating in the negotiation) to the director instead of hiring a new director or promoting a successful worker to the director. This leads to:

Proposition 3 *The monitoring level with no newcomer to the corporate board is expressed as:*

$$d'(p) = q\pi_H + (1-q)\pi_N - \pi_I. \quad (16)$$

Note that (16) equals the optimum level of monitoring (15), when $\pi_N > \pi_{\hat{N}}$ holds, and hence the monitoring level is always larger than (10). Even though the incumbent CEO might not have been a good match as a manager who leads the company, given his/her knowledge and experience of the company, s/he may still remain on the board as one of the directors that participate in principle decision makings or monitoring.

However, this may not be the plan of action, for re-employing the retired CEO may happen for once, but this is not realistic for all n members on the board who have promoted to the new CEO’s post. Therefore, in the real world practice, what has been discussed in section three holds.

5. Conclusion

This paper concerns one of the reasons that causes inefficient CEO retentions and CEO appointments. All the incumbent members jointly determine the succession policy, the incumbent CEO's wage, and the monitoring level. When they jointly determine these issues, they do not internalise the welfare of the potential newcomer. Thus, the incumbents are maximising their joint expected utility, but what they are maximising has a utility leakage from the whole group. I show that the equilibrium monitoring level departs from the optimum monitoring level of the corporation, thus too often resulting in inefficient CEO retention. I also show that the equilibrium succession policy may depart from the optimum succession policy, the latter of which is the optimum from the shareholders' perspective.

In this model, the incumbent board and CEO do not negotiate with the potential CEOs only to simplify the exposition. That is, even if the model allows the board and CEO to have a choice of negotiate or not to negotiate with potential CEOs, they may choose not to negotiate if they consider 'leakage' to be large, thereby making the firm decision departing from shareholders' expectation. However, if there is a system in which someone, such as a block-shareholder, can negotiate in place of the newcomer, such inefficiency can be avoided. A contingent governance system as suggested by Aoki (1988), may be one solution. That is, a block shareholder (e.g. main-banks in Japan) can participate in negotiation in financial distress situation (they are not the 'incumbent members' in ordinary situations), and hence allows the internalisation of the newcomer's welfare.

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Appendices

Appendix A 1. Proof of Proposition 2(1): (10)

$$V_I \equiv \left\{ pq\pi_H + p(1-q) \left[(n-1) \frac{(\pi_N - w_N)}{n} + b + w_N \right] + (1-p)\pi_I - d(p) - w - \theta_B \right\} \\ \times \{ [pq + (1-p)]b + w - \theta_C \}.$$

I denote θ_B and θ_C as the threat points of each players, where (θ_B, θ_C) is assumed to be an interior point of the feasible set. In this model, whatever the amount of the threat point which is in the interior of the feasible set, it does not affect the decisions regarding the succession policy and the monitoring levels. Denote the first bracket as A and the second as B. Then, the first-order condition maximising V_I with respect to p yields

$$\frac{\partial A}{\partial p} B + \frac{\partial B}{\partial p} A = 0. \tag{17}$$

Next, derive the first-order condition maximising V_I with respect to w . This yields

$$-B + A = 0. \tag{18}$$

Thus, from (17) and (18), $\frac{\partial A}{\partial p} + \frac{\partial B}{\partial p} = 0$ is obtained. Hence, this is the maximization (w.r.t. p) of the ‘joint’ expected utility. Then, organize this to obtain $d'(p)$, which is expressed as:

$$d'(p) = q\pi_H + (1-q)\pi_N - \pi_I - (1-q) \frac{1}{n} (\pi_N - w_N),$$

which is the level of monitoring as shown in (10). Thus, the frontier is expressed as 45-degree line, for w is transferable.

The wage w is determined as:

$$w = \frac{1}{2} \left\{ \begin{array}{l} pq\pi_H + p(1-q)(n-1) \left(\frac{\pi_N - w_N}{n} + w_N \right) + (1-p)\pi_I \\ -d(p) - \theta_B + \theta_C + b(2p - 2pq - 1) \end{array} \right\}.$$

Q.E.D.

Appendix A.2. Proof of Proposition 2(2): (11)

$$V_O \equiv \left\{ p \left[q\pi_H + (1-q)(\pi_{\hat{N}} - w_{\hat{N}}) \right] + (1-p)\pi_I - d(p) - w - \theta_B \right\} \\ \times \left\{ [pq + (1-p)]b + w - \theta_C \right\}$$

I denote θ_B and θ_C as the threat points of each players, where (θ_B, θ_C) is assumed to be an interior point of the feasible set. Denote the first bracket as A and the second as B. Then, the first-order condition maximising V_O with respect to p yields

$$\frac{\partial A}{\partial p} B + \frac{\partial B}{\partial p} A = 0. \quad (19)$$

Next, derive the first-order condition maximising V_O with respect to w . The first-order condition with respect to w yields

$$-B + A = 0. \quad (20)$$

Thus, (19) and (20) yields $\frac{\partial A}{\partial p} + \frac{\partial B}{\partial p} = 0$. Hence, this is the maximization (w.r.t. p) of the joint expected utility. Organize this and $d'(p)$ is obtained as:

$$d'(p) = q\pi_H + (1-q)\pi_{\hat{N}} - \pi_I - (1-q)(b + w_{\hat{N}}),$$

which is the level of monitoring as shown in (11). Thus, the frontier is expressed as 45-degree line, for w is transferable.

The wage w is determined as:

$$w = \frac{1}{2} \left\{ \begin{array}{l} pq\pi_H + p(1-q)(\pi_{\hat{N}} - w_{\hat{N}}) + (1-p)\pi_I \\ -d(p) - \theta_B + \theta_C - [pq + (1-p)]b \end{array} \right\}.$$

Q.E.D.

Appendix A.3. The proof of renegotiation about the succession policy

Below I show that even if the existing board re-determines the succession policy after the incumbent CEO's tenure has been terminated, it still adopts the same succession policy as what have been determined together with the incumbent CEO in the first stage.

If the board were to re-determine the succession policy, it will take place between the third and the fourth stage. At this stage, the wage to the incumbent CEO and the

amount paid to the specialist are already determined and they cannot change the contract even after the CEO has been dismissed. Therefore, the board's expected utility will be expressed as

$$\pi_{\hat{N}} - w_{\hat{N}}, \tag{21}$$

if they decide to hire from outside. On the other hand, if the board decides to recruit one of the inside directors to the new CEO, its expected utility will become

$$(n-1) \frac{\pi_N - w_N}{n} + (b + w_N). \tag{22}$$

The comparison of (21) and (22) yields the same result as Proposition 1.

Q.E.D.

AppendixA.4. Deriving $\pi_H > \pi_I > \pi_L$, $\pi_H > \pi_{\hat{N}} > \pi_L$, and $\pi_H > \pi_N > \pi_L$ by the Bayes' Rule

A CEO's talent is given exogenous as a_i ; $i \in \{H, L\}$; where a_H stands for high talent and a_L stands for low talent. No player knows CEO's true talent. The prior distribution of the talent of the incumbent CEO is given exogenous as γ_i , $i \in \{H, L\}$ where $\gamma^H > \gamma^L$, and $\gamma^H + \gamma^L = 1$. γ^H represents the incumbent CEO is of type a_H and γ^L represents that the incumbent CEO is of type a_L . On the other hand, the prior distribution of the talent of any new potential CEO (regardless of whether he is a director on the board or an outsider) is assumed to be 1/2 for both being a_H and a_L . The profit of the firm is denoted X_j , $j \in \{H, L\}$, where $X_H > X_L > 0$. Then the conditional probability of outcome dependent on the talent of the CEO is expressed as $P_j^i \equiv \Pr\{X_j | a_i\}$. For example, P_L^H is the probability that the CEO produces X_L conditional on a_H .

I assume $P_H^H > P_H^L$ and hence, $P_L^L > P_L^H$ holds. Given these assumptions, the expected firm profit conditional on CEO's talent is expressed as $\bar{X}^H \equiv P_H^H X_H + P_L^H X_L$ when the CEO is of type a_H . It is expressed as $\bar{X}^L \equiv P_H^L X_H + P_L^L X_L$ when the CEO is of type a_L . The board receives a share of ρ from \bar{X}^H or \bar{X}^L . That is, the expected board profit can be expressed as $\rho \bar{X}^H$ and $\rho \bar{X}^L$. Thus, the expected board profit when the incumbent CEO serves to the end without his/her talent being updated is expressed as:

$$\pi_I \equiv \rho \left[\gamma^H (P_H^H X_H + P_L^H X_L) + \gamma^L (P_H^L X_H + P_L^L X_L) \right].$$

The expected board profit when a new CEO is appointed (from inside the board) is expressed as:

$$\pi_N \equiv \left[\frac{1}{2} (P_H^H X_H + P_L^H X_L) + \frac{1}{2} (P_H^L X_H + P_L^L X_L) \right].$$

I denote as $\pi_{\hat{N}}$ the expected board profit when a new CEO is appointed from outside

the board:

$$\pi_{\hat{N}} \equiv \rho \left[\frac{1}{2}(P_H^H \hat{X}_H + P_L^H \hat{X}_L) + \frac{1}{2}(P_H^L \hat{X}_H + P_L^L \hat{X}_L) \right],$$

where the outcome \hat{X}_H is different from X_H , and \hat{X}_L is different from X_L . A new CEO has the prior probability of $a_H = \frac{1}{2}$ whether recruited from inside the board or from outside the board, but outcomes are different. That is why the expected outcomes depending on distribution of CEO's talent are different. I assume $\pi_I > \pi_{\hat{N}}$ and $\pi_I > \pi_N$.

The expected profit of the board when the specialist monitors the CEO and gives the board an informative indication of the CEO's talent is as follows.

The board obtains an informative indication $y \in \{y_G, y_B\}$ with probability p . The probability distribution on $\{y_G, y_B\}$ conditional on the talent of the CEO is expressed as $R_j^i = \Pr(y_j | a_i)$. With probability $(1-p)$, the board receives non-informative indication about the incumbent CEO. When the board receives y_G , it believes that the CEO is likely to have high talent with probability of $\frac{\gamma^H R_G^H}{\gamma^H R_G^H + \gamma^L R_G^L} \equiv \mu_G^H$. It is assumed that $\mu_G^H > \gamma^H > \frac{1}{2}$ ($\mu_G^L = 1 - \mu_G^H < \frac{1}{2}$) for the monitoring raises the expected outcome of the firm if the incumbent CEO is believed to be likely to be type H . Likewise, $\mu_B^H \equiv \frac{\gamma^H R_B^H}{\gamma^H R_B^H + \gamma^L R_B^L}$ and this is assumed to be $\mu_B^H < \frac{1}{2}$ ($\mu_B^L > \frac{1}{2}$). Given these assumptions, if the board receives y_G with probability q , the board is expected to obtain:

$$\pi_H \equiv \rho \left[\mu_G^H (P_H^H X_H + P_L^H X_L) + \mu_G^L (P_H^L X_H + P_L^L X_L) \right].$$

If the board observes y_B with probability $(1-q)$, the expected board profit is expressed as:

$$\pi_L \equiv \rho \left[\mu_B^H (P_H^H X_H + P_L^H X_L) + \mu_B^L (P_H^L X_H + P_L^L X_L) \right].$$

Therefore, $\pi_H > \pi_I > \pi_L$, $\pi_H > \pi_{\hat{N}} > \pi_L$, and $\pi_H > \pi_N > \pi_L$ are derived.

Q.E.D.

Appendix A.5. The proof for the social surplus maximisation in section 4.1

The expected utility of the whole group under outside recruiting policy is expressed as follows: The expected utility for the board (with n directors) is

$$pq\pi_H + p(1-q)(\pi_{\hat{N}} - w_{\hat{N}}) + (1-p)\pi_I - w - d(p). \quad (23)$$

The expected utility of the incumbent CEO is

$$pqb + (1-p)b + w. \quad (24)$$

The expected utility for the potential CEO (who is the newcomer to the group under the outside recruiting policy) is

$$p(1-q)(b + w_{\hat{N}}). \quad (25)$$

Thus, the sum of all three players (the sum is derived as a result of Nash bargaining) is expressed as

$$pq\pi_H + p(1-q)\pi_{\hat{N}} + (1-p)\pi_I - d(p), \quad (26)$$

and the equilibrium monitoring level is derived as:

$$d'(p) = q\pi_H + (1-q)\pi_{\hat{N}} - \pi_I. \quad (27)$$

The expected utility of the whole group under inside promotion policy is expressed as follows: The expected utility for the board (with n directors) is

$$pq\pi_H + p(1-q)\left[\frac{n-1}{n}(\pi_N - w_N) + b + w_N\right] + (1-p)\pi_I - w - d(p), \quad (28)$$

where the potential new CEO's expected utility is internalised in the above expected utility as $p(1-q)(b + w_N)$. This is because one of the incumbent directors becomes the new CEO if the incumbent CEO is dismissed. The expected utility of the incumbent CEO is the same as that of the outside recruiting policy, and it is (24).

The expected utility of the new director who will be hired after the CEO replacement (who will be considered as a newcomer to the group under the inside promotion policy) is expressed as

$$p(1-q)\frac{1}{n}(\pi_N - w_N). \quad (29)$$

Thus, the sum of all three players (the sum is derived as a result of Nash bargaining) is expressed as

$$pq\pi_H + p(1-q)\pi_N + (1-p)\pi_I - d(p), \quad (30)$$

and the equilibrium monitoring level is derived as:

$$d'(p) = q\pi_H + (1-q)\pi_N - \pi_I. \quad (31)$$

From (27) and (31), the optimum monitoring level for the group is expressed as

$$d'(p) = q\pi_H + (1-q)\max\{\pi_{\hat{N}}, \pi_N\} - \pi_I. \quad (32)$$

Hence, (32) is the same as (15).

Q.E.D.

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End Notes

- 1 In this paper, the incumbent board does not bargain with potential CEOs (newcomers to the management group), as in Aghion and Bolton (1987), but instead, it bargains only with the incumbent CEO for simplicity. This is because the same logic is obtained with the case in which the model is build in a way to allow the incumbent board to choose whether to negotiate or not with potential CEOs. That is, the board will choose to negotiate with a potential CEO if the board expects the amount of additional profit brought to the board exceeds the amount of leakage to a potential CEO, but the board decides not to negotiate with a potential CEO if the opposite holds. Thus, the board decision is based on maximising its own surplus by minimising the amount of leakage.
- 2 Similar to Hermalin and Weisbach (1998), the CEO in this paper does not make efforts, and monitoring is done to replace bad match CEO with a new CEO, for the profit of the firm is dependent on the talent of the CEO.
- 3 In Hermalin and Weisbach (1998), monitoring levels are defined through board composition, which is determined by the board and the incumbent CEO. Specifically, they Nash bargain over a new board member, whose monitoring cost is determined by how independent s/he is from the incumbent CEO.
- 4 The incumbent CEO can be involved in Nash bargaining and determines his/her wage, for s/he has been working in the firm for a while and the board has found him more talented than those in the market. The wage of the CEO is determined in Nash bargaining by the board members and the CEO himself, as in Hermalin and Weisbach (1998), for some talents that make the CEO more capable than other CEOs are specific to the firm, making them unable to be evaluated properly outside the firm. When a new CEO is hired, s/he will receive some wage, but s/he does not have the bargaining power to negotiate over it with the board.
- 5 Any potential CEO's talent is assumed to be the same as those in the market and hence s/he does not have any rent.
- 6 See Coase (1960).
- 7 Refer to the surveys provided by Hermalin and Weisbach (2003), Gillan (2006), Adams et al (2008) for both theoretical and empirical studies. Also refer to Tirole (2006).
- 8 Sato (2007) applies the concept developed in this paper to assess Japanese corporate govern-

- ance in which CEOs are basically internally promoted from the incumbent board members. Lazear and Rosen (1981), Rosen (1986), and Chan (1996) develop models on internal promotion system, but from different angles from Sato (2007).
- 9 The board updates the incumbent CEO's talent by monitoring (e.g. reviewing his/her conduct). Then, if it believes that the CEO has poor talent, the board will replace the CEO. Therefore, the purpose of the monitoring is to fire a sub-standard CEO and to hire a new CEO who is expected to increase the corporate profit. (The profit of the firm is dependent on the talent of the CEO in their model and also in this paper.)
 - 10 See Wilson (1968) for treating players of the same utility function as one group.
 - 11 For example, outside CEO candidates may be management experts in the same industry and may be talented. However, they may not fit the culture of the company. On the other hand, insider CEO candidates may be very knowledgeable about their company, but at the same time, may not be able to make the necessary changes in management. Bower (2007) argues that the insider with the outsider's perspective (which s/he refers to as inside outsiders) would be the best successor. Since it is beyond the scope of this paper to argue about inside outsiders, I assume the priors about the abilities of both candidates to be the same, even though the outcome may be different. The detail is in the Appendix A.4.
 - 12 In their model, CEO replacement can induce 'leakage.' However, they do not discuss the effect of it on board decision makings. Hence, I would like to provide a model of how 'leakage' affects the decisions determined by the board by extending their model. Also, another new feature of this paper is to incorporate the process in which the board determines where to hire the next CEO from, which was given exogenous to the model proposed by Hermalin and Weisbach (1998).
 - 13 In Hermalin and Weisbach (1998), the initial CEO's talent is updated before the negotiation in order to give the CEO some bargaining power. However, this process can be shortened by assuming the prior about his/her talent to be higher than any new potential CEOs. See Appendix A.4. about the priors and the posteriors.
 - 14 Even if the remaining directors renegotiate the succession policy after they dismiss the initial CEO in stage three, they still choose the same policy as determined in the first stage. Therefore, it may seem as if the directors commit to the succession policy determined in the first stage, but it is not a commitment. The succession policy is determined in the first stage to simplify the analysis.
 - 15 From the perspective of the game theory, the wage w_N that will be paid to the internally promoted CEO could be endogenously determined. If I do so, the incumbent directors will increase the amount of wage w_N as much as possible ($\frac{n-1}{n}\pi_N + b + \frac{1}{n}w_N$, which can be derived from the expression (3) presented later in this subsection). However, the shareholders will not allow such extremely high wage determined by the inside directors.
 - 16 The substantial result in this paper will not be affected if the amount of b is different for the CEO who was retained because s/he was believed to be talented, and who was retained because of lack of information to fire him/her.
 - 17 Note that when the board decides to recruit the new CEO from outside the board, none of the incumbent directors become CEO candidates. One way to interpret this type of board is to consider it as a board composed solely of outside directors. An outside director usually has his/her primary job elsewhere, such as a professor, and hence s/he has no incentive to become the successor CEO of the company in which s/he is serving as an outside director.
 - 18 When the board decides to recruit the new CEO from within, all the incumbent directors become the potential CEOs. Thus the board with the internal promotion policy can be

- considered to have the same expected utility as the board composed solely of inside directors.
- 19 Note that there are two possible cases for the newcomers. When the board recruits the CEO from outside, the newcomer is the new CEO. When the board promotes one of the incumbent directors to the board, the newcomer is then the new director who is hired to refill the board. In the long term, the board size may decrease, but in the short term, the board needs to keep a certain number of directors to keep its job operating. Moreover, refilling the board has an aspect of giving incentives to the workers to work hard in order to get internally promoted to be the director in the future.
 - 20 Free disposal is assumed. Since the frontier is linear, the feasible set of Nash bargaining is convex.
 - 21 Since one or the other feasible set always encompasses the other, the feasible set with the larger capacity (higher ceiling) always makes the players better off.
 - 22 Charkham (2005) points out that a manager's attitude (and thus hiring tendencies) may not change even after companies that started as family businesses have grown to publicly quoted companies.
 - 23 The proof is provided in Sato (2008).

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