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Corporate Governance and Internal Organization

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ABSTRACT

This paper jointly designs the level of external control that financial claimants have; characterized as likelihood of performance-based CEO dismissals, and the internal organization of firms. While the internal organization of a firm affects competition between lower-level managers to become the CEO, performance-based CEO dismissal and replacement alters the incentives due to this competition. I show CEO dismissals are more likely to be accompanied by an outside replacement and that such governance mechanisms reduce the counterproductive activities ("power struggles") and can increase the productive activities that arise due to managerial competition. This enables the CEO to directly access more managers and increase managerial competition. However, strong governance may also reduce managerial incentives to acquire skill to become the CEO. As lower level managers have a greater impact on firm performance, strong governance, flatter firms and greater pay inequality is optimal.

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"(They have to get) competitive and that means cutting out several layers of management." - T. Boone Pickens Jr., "Boone", 1987.

"Layers of bureaucrats reporting to bureaucrats must end." - Carl Icahn, Business Week, 1986.

I. Introduction

This paper provides a theoretical link between the external control that financial claimants have and how organizations are structured. Specifically, I provide a framework to jointly design the strength of firm-level corporate governance and the internal organization of firms. The framework simultaneously sheds light on three documented trends over the last two decades.

First, shareholder activism has increased causing greater CEO dismissals and greater cases of outside replacements for the CEO. The hostile takeover wave of the eighties triggered changes in the previously weak corporate governance environment.[1] In the 90's however, shareholder activism has been characterized by large institutions, such as TIAA-CREF and CALPERS.[2] Irrespective of the specific form of governance, Chief Executive Officer (CEO) dismissals have steadily increased (Huson, Parrino and Starks (2001)). Further, not only is CEO turnover higher but instances of forced turnover and outside succession have increased as well.[3] Khurana and Sonnenfield note that 'among the top 200 firms, 50% of CEOs are now outside recruits, compared to 7% in 1980'.[4] **Second**, firm organization is changing. More

[1] Holmstrom and Kaplan (2001) note that before the 80's "the external governance mechanisms available to dissatisfied shareholders were seldom used. Raiders and hostile takeovers were relatively uncommon. Proxy fights were rare and didn't have much chance of succeeding. And corporate boards tended to be cozy with and dominated by management, making board oversight weak."

[2] For example, Gompers and Metrick (2001) report that from 1980 to 1996, large institutional investors nearly doubled their share of ownership of U.S. corporations from less than 30% to more than 50%. For a detailed discussion on the changes over the last 20 years, see Holmstrom and Kaplan (2001) and Kaplan (1997).

[3] The cover story in business week ('The CEO Trap', 11 December 2000) reported that two-thirds of major companies worldwide have replaced their CEO at least once since 1995 and more than 1000 U.S CEOs have left office in 2000.

[4] 'Manager's Journal : Fishing for CEO's in your own backyard', Wall Street Journal, July 3, 2002. They also note that one-third of the exits were due to dismissal.

executives now directly report to the CEO and there are fewer levels between the CEO and the lower-level managers (Rajan and Wulf (2003)). To remain consistent with the terminology in Rajan and Wulf (2003), I term this the 'flattening' of firms. Using a detailed database of job descriptions and compensation data for 300 large US firms, Rajan and Wulf find that the median number of managers reporting directly to the CEO has increased from 4 in 1986 to 7 in 1999. Over the same period they also find that the depth, defined as the number of levels between the CEO and the division head, has reduced by 25%. An accompanying **third** trend is the increasing pay inequality in top management teams. Rajan and Wulf (2003) report that the ratio of CEO pay (salary plus bonus) to the next level manager's pay (salary plus bonus) has increased from 2.8 to 4.56.[5]

In addition to this positive motivation, the paper has a normative point as well. The strength of corporate governance mechanisms affects CEO succession and hence alters the incentives of managers inside the firm who expect to gain power by becoming the CEO. How these incentives are affected depend not only on the strength of governance mechanisms but also on the internal organization of the firm. It is precisely this link that the paper emphasizes by undertaking a joint design of firm-level corporate governance and the internal organization of firms.

In the framework presented, the role of internal organization is to set up rules that determine the access of each manager to the firm's physical and human resources (Rajan and Zingales (1998, 2001)). Specifically, I focus on the access that firm managers have to headquarters.[6] Greater access to headquarters allows managers to accumulate skills that are required to be the CEO and to be observed by the incumbent CEO. If later selected as CEO, the acquired skill gives them power to bargain with the shareholders (Rajan and Zingales,

[5]The pay inequality rises further if one accounts for other forms of compensation; from 3.37 in 1986 to 6.81 in 1999. Median long-term incentive pay for divisional managers as a fraction of their salary and bonus goes up from 0.32 to 0.58. For CEOs, median long-term incentive pay goes up from 0.59 to 1.36. For further description see Rajan and Wulf (2003).

[6]I use access to headquarters interchangeably with access to the CEO. This captures access to the various aspects that allow skill acquisition by the division manager such as witnessing important firm decision making, more chances to learn the CEO's management style, a chance to interact with the board of directors etc.

1998).[7] However, the selection process involves intrafirm managerial competition that leads to both productive and counterproductive activities ("power struggles").[8] Categories of these counterproductive activities include influencing the incumbent CEO's decision by lobbying or 'sucking up', spending too much time on activities observable by the CEO, spending too much time on skill generating activities, noncooperation with other CEO candidates, lying to the CEO about division prospects (Ozbas, 2003) or even sabotage.[9] To sum then, the internal organization of the firm – characterized by the number of managers with access to the CEO (CEO candidates) – affects the amount of time and effort that managers spend on productive and counterproductive activities. [10]

The aspect of strong governance I emphasize in the paper is performance-CEO dismissals. The threat of CEO dismissal and possible replacement alters the incentives of managers inside the firm who expect to gain power by becoming the CEO. If such dismissals also increase the likelihood of an outsider replacement, managerial incentives to indulge in counterproductive activities reduce. Expending effort in these counterproductive activities only increases the probability of an outsider replacing the incumbent CEO, reducing each manager's chances of gaining power. Conversely, greater productive activities now reduce the probability of an outsider replacement. This reduction (increase) in counterproductive (productive) activities now enables the CEO to flatten the firm without the fear of managerial power struggles. The increased access to lower level managers increases CEO power and gives a greater number of lower level managers a chance of attaining the CEO's position.

[7] More generally, CEO power can be thought of as arising from factors that give the CEO, by virtue of his position, more than his reservation wage. Another factor, apart from the bargaining view, could be the use of CEO pay as an incentive device for lower level managers. A more detailed discussion can be found in section V.

[8] When the CEO of GE, Jack Welch announced that he would delay naming his successor for another 6 months, Wall Street Journal carried an article on the concerns of internal conflict due to this delay (23 October 2000). The share price dropped by 4.6% as well.

[9] Prior literature has termed such activities rent seeking (Holmstrom, 1982), influence activities (Milgrom, 1988 and Milgrom and Roberts, 1988), noncooperation and sabotage (Lazear, 1989) etc. The idea that non-productive activities arise due to the presence of a centralized authority was articulated by Krueger(1974) and Bhagwati(1982) in the context of public institutions. Empirical evidence in support of sabotage and noncooperation has been recently documented by Garicano(2000) in a sports environment.

[10] There might be greater costs to processing greater information from more managers (Simon, 1957). I abstract from these costs. The maximum degree of flatness allowed in this paper (N) should be viewed as the information efficient structure that takes into account all such informational frictions. See, e.g. Keren and Levhari (1983).

Strong corporate governance mechanisms are also associated with costs. As the chances of outsider replacement increase, managerial incentives to acquire the necessary skill *may* be weakened as well. In general, the incentives to acquire skill depend on two factors - the chance of gaining power and the reward (the pay inequality). In addition to corporate governance, the internal organization of the firm also affects these factors. Optimal corporate governance weighs the benefits of lower counterproductive and higher productive activities with the costs of lower incentives to acquire skill to determine the strength of these CEO dismissal mechanisms. I analyze the conditions when optimal corporate governance is associated with flatter firms by jointly designing internal organization and corporate governance and find that strong governance and flatter firms are desirable are the importance of lower-level managers increase.

An extension of the framework presents a novel interaction between homogeneity in industries and governance. The presence of strong governance increases the number of interfirm transfers at the top management level. This reduces each manager's incentives to indulge in intra-firm power struggle activities, enabling a larger number of firms to be flat. Therefore the presence of good governance in even a few firms can enable the other firms in the industry to benefit from it. Finally, I endogenize the choice of CEO replacement by discussing why using an outsider replacement is more desirable than an insider replacement in forced CEO dismissals.

There are four contributions of this paper. First, the paper makes a simple yet fundamental point - the presence of strong shareholders enables the empowerment of more managers inside the firm.[11] This simple point explains the three trends that have characterized the last two decades and is in contrast to most of the literature in finance where governance design is unrelated to the internal design of the firm.[12] Conversely, it also adds to the vast literature

[11]The result, though derived differently, is similar in spirit to Mueller and Warneryd(2001) who use outsider ownership, to reduce the free rider problem and reduce the losses associated with internal conflict. Further, Mueller and Warneryd (2001) focus on inside versus outside ownership and abstract from internal organization and governance induced dismissals.

[12]Garicano(2000), providing a technology based explanation for the changes in hierarchy and pay inequality, notes that a shortcoming of the incentive approach to organizations is that hierarchical forms were assumed rather than derived.

in the design of hierarchies by noting the role of external shareholders. This role is shown within a strand of the internal organization literature that emphasizes the role of hierarchies in allocating access to firm resources. (Rajan and Zingales (2001)).[13]

Second, the paper designs corporate governance optimally, even when there exists no exogenous costs of governance. The benefits (making managerial competition more productive) and the costs (reduction in managerial skill acquisition) are derived from the framework. This is in contrast to much of the literature that has emphasized the benefits, often exogenous, of corporate governance.[14] Third, the paper adds to the literature on the theory of the firm. Milgrom (1988) suggested that the reason not all production activity is carried out in one firm is the presence of 'influence costs' that arise due to counterproductive activities by those subject to central authority. If this is true, the paper suggests that the presence of governance will not only makes firms flatter but also bigger.[15] Finally, the paper provides insights on where one might observe higher pay inequality at the top management level even when the CEO has no agency costs. It emphasizes that aspects such as internal organization and corporate governance shape the CEO pay and should be considered in the debate over excessive CEO compensation.

The rest of the paper is organized as follows. In the next section I present the basic framework. Section 3 characterizes the optimal design of corporate governance and internal organization. Discussion and Extensions are undertaken in Section 4. Section 5 uses the framework to shed light on the three aforementioned trends that have characterized the US economy over the last two decades and presents new empirical implications. The conclusion follows.

[13]There are four general categories the literature on internal organization can be grouped into. A first one deals with information processing, where agents in hierarchies are information processors (Radner, 1992, Bolton and Dewatripont, 1994) or resource allocators (Cremer, 1980 and Geanakoplos and Milgrom, 1991). A second one focuses on monitoring as the main role of managers (Calvo and Weillisz, 1978 and Qian, 1994). A third strand (Rajan and Zingales, 2001) studies the role of hierarchies in administering access to core resources. Finally, Garicano (2000) studies the role of hierarchies in knowledge acquisition.

[14]An exception is Burkart, Gromb and Panunzi (1997) where the costs of governance endogenously arise due to the reduced authority of the CEO.

[15]The spate of large scale mergers might be indicative of these changes.

II. Model

Consider a firm in an overlapping generations where each agent lives for two periods. At the beginning of each period, the shareholders hire an "old" CEO and $F(1 \leq F \leq N)$ "young" (division) managers (M_i) to execute a project. It is this choice of F that determines the degree of firm flatness. After acquiring CEO management skills (as a manager) in the first period, an agent can become the Chief Executive Officer (CEO). [16]

Therefore, at the beginning of each period, the CEO lives for one period whereas the managers live for two periods. At time t (today), the shareholders design the strength of corporate governance mechanisms while the CEO designs the internal organization (hierarchy of access to headquarters).[17]

A. Sequence Of Events Each Period

The sequence of events in each period is shown in figure 1. At the beginning of each period the managers bargain with the CEO and the shareholder; and the CEO bargains with the shareholders over future surplus and signs sharing contracts.[18] As in Hart and Moore(1990) and Rajan and Zingales (1998, 2001), I use coalition Nash bargaining and the Shapley value as the solution concept for the bargaining game. The managers who are given access to headquarters work to acquire firm specific skill relevant for the CEO position and choose the level of effort in productive and counterproductive activities, denoted by p and n respectively. While the manager indulges in these activities to affect his chances of gaining CEO power, the activities

[16] For simplicity, I assume that old agents who are not selected as the CEO leave the firm. This assumption benefits the exposition of the paper and the results remain unchanged without it. In the absence of this assumption, the competition to become the CEO arises every alternate period instead of every period. In the presence of productive activities, analyzed in section 4, this assumption is not required, as firms would automatically dismiss old agents since they have no incentive to work.

[17] Since the shareholders' choice of the internal organization will not differ from the CEO's choice, the results remain the same if the shareholders design the internal organization too.

[18] Motivated by the literature on tournament theory (Lazear and Rosen (1981), Rosen (1989)), I also consider an alternative mechanism that determines CEO pay and hence pay inequality. See section 5.

also affect firm value. The CEO then takes an action to affect firm value. This action, for example, could simply be a project-specific decision or a strategic choice based on the information from his managers. The action affects the future cash flows that will be realized if the CEO continues. Shareholders observe this predicted cashflow and contingent on the strength of the governance mechanisms in place, may dismiss the incumbent CEO to choose an outside rival.[19] The final cash flows are realized at the end of the period.

B. Project and Information

Since the focus is not on the technological limits to firm flatness, I assume that each agent can contribute 1 unit. Therefore a firm with F divisions/managers has the potential of producing $F+1$ units. The chance of realizing this potential depends on the existence of a skilled CEO and the manager's activities, p and n. If the CEO is skilled, the probability of getting $F+1$ is $Mg(\Sigma p_i, \Sigma n_i)$, where i denotes the managers, p and n denote the time and effort in productive and nonproductive activities respectively; and M $(0 < M < 1)$ captures the managerial impact on firm performance ($g(0,0)$ is normalized to 1).[20] The following assumptions are made about the properties of $g(p,n)$.

A.1 $\frac{dg(p,n)}{dp} > 0$, $\frac{dg(p,n)}{dn} < 0$

The assumptions together state that the likelihood of success increases as managers increase time in productive activities and as they spend lesser time and resources in nonproductive power struggles. When there are no power struggle activities, the probability of success is M and this represents the base level of managerial impact. The underlying assumption regarding the technology is stated below.

[19] Alternatively, the governance mechanisms affect the probability of receiving a signal about future cash flows and dismissal is certain if the signal is poor.

[20] p can also be viewed as the benefits of increased managerial incentives to work due to flattening, as in Aghion and Tirole (1997) and Stein (2001). For supporting evidence, see Liberti (2003).

A.2 Both CEO and Managers impact firm value. [21]

C. Preferences

Although shareholders have ownership, contracts are incomplete and the CEO and the managers enjoy private benefits, B. The private benefits are non transferable. The reservation wage for all agents is public information and is R.[22] The managers who have access to the CEO can further acquire skill at a cost c_S. This additional skill acquired can be thought of as firm specific skill and comprises of many different elements all of which cannot be objectively specified.[23] Consequently, managerial skill levels cannot be observed and the manager can only signal his skill by his actions in productive or unproductive activities. The private costs due to effort in productive and counterproductive activities is $\frac{1}{2}k_p p^2$ and $\frac{1}{2}k_n n^2$ respectively.

D. Corporate Governance and Succession

After the CEO takes action, a rival appears. The rival lacks management skill. I assume that once the rival has access to headquarters he takes time to acquire firm specific skill and can only use the acquired skill in the next period. This ensures that the rival continues as CEO in the next period. In the current period however, under the rival's management the project pays off S ($0 < S < F + 1$) with certainty. Thus it is optimal for the shareholders to replace the incumbent with the rival when they observe the predicted cash flows to be 0. On the other hand if the predicted cash flow is F+1, the incumbent CEO will not be dismissed. This ensures that the threat of CEO dismissal is credible when performance is poor and that the CEO continues if he performs well. This specification creates a role for strong corporate governance.

[21] In the model presented here, CEO skill and manager contributions are complementary. The results are qualitatively similar if managerial information and CEO skill were substitutes. What is important is that both managerial information and CEO skill have an impact on productivity.

[22] The reservation wage for the CEO is arguably higher than that of the manager. Accounting for this only increases CEO Power and strengthens the results.

[23] Skill is therefore not contractible.

A3. It is optimal to replace the incumbent CEO when firm performance is poor. ($0 < S < 2$)

However, since the CEO stands to lose his private benefits due to dismissal, there is a conflict between shareholders and the CEO. If the incumbent CEO has control of the board (Almazan and Suarez, 2003) or there exists a large number of takeover defenses in place, he might be entrenched. On the other hand, if the governance mechanisms are strong and effective, he will be dismissed according to the shareholder's wishes. δ ($0 \leq \delta \leq 1$) captures the differences between the strength of different governance structures. I focus on the two extreme cases of strong governance ($\delta = 1$) and weak governance ($\delta = 0$).

When the incumbent CEO continues till the end of his term (natural succession), the new CEO is chosen among managers who have had access to the headquarters. To select among managers who have both had access, the CEO uses the signals generated by the managers. Thus he views a manager M_i favorably with probability $f = w_p p_i + w_n n_i$.[24] If the manager's productive activity is clearly detected by the CEO, then w_p is high. Initially, however, to focus only on the counterproductive activities, we assume $f = n_i$ (section 3). It is assumed here that forced dismissals increase the likelihood an outside replacement relative to natural successions. Within the framework here, we will later see, in section 4, that the probability of an outside replacement is optimally higher when dismissal is based on poor performance. For supporting evidence, see Huson, Parrino and Starks (2001).

III. Governance and Managerial Competition

This section jointly designs the strength of corporate governance (δ) and the number of managers reporting to the CEO (F). Since managerial nonproductive activities is the central ingredient in the model, I initially focus only on such nonproductive activities and abstract from productive activities. As shown in section 4, considering productive activities as well

[24] When the non productive activity takes the form of noncooperation or sabotage, the CEO views the manager M_i favorably with probability $f = w_p p_i + w_n n_j$). These alternative forms generate same results since I solve for symmetric solutions and do not rely on a specific form of the non-productive activity.

strengthens the basic results presented in this section. i further assume that S, firm value under the rival's management, is a small number close to $0(\varepsilon)$. This ensures that there are no exogenous benefits of corporate governance that arise from the replacement decision. We will see the impact of CEO skill in section 4.[25] Before I proceed to the joint design problem, the payoffs to different agents are analyzed to characterize CEO power.

A. Bargaining and CEO Power

Once selected as CEO, the agent has bargaining power since he has acquired firm specific skills that outsiders lack and hence is able to get more than his reservation wage.[26] It is precisely the desire for this power that elicits productive and counterproductive activities from managers. In this section, I derive the payoffs to the managers, CEO and the shareholder to endogenously determine the pay inequality, Δ_F, that exists between CEOs and managers.

The manager bargains with a unified coalition of his CEO and the shareholders over the total surplus. The share the coalition gets from this first stage of bargaining is then further subdivided through bargaining, between the CEO and the shareholders. In the bargaining between the coalition of superiors and the manager, the outside option of the coalition is to produce without the manager. In the bargaining between the shareholders and the CEO, the outside option of the shareholders is to use the unskilled CEO. The outside option of the manager and the CEO is to obtain a wage of R elsewhere.

Splitting the value the manager contributes equally, each manager gets $R+\frac{1}{2}$ when the output is $F+1$. The CEO and the shareholders bargain over the remaining output. Shareholders receive half of what is left over from the managers' contributions as well as half of the CEO's contribution and the value of the outside option (ε),. Therefore the shareholders receive $\frac{F}{4}-\frac{FR}{2}+\frac{1}{2}-R+\varepsilon$ when the output is $F+1$. Finally, the CEO receives $\frac{F}{4}-\frac{FR}{2}+R+\frac{1}{2}-\varepsilon$

[25] As the firm value under the rival's management increases, the importance of CEO skill reduces.

[26] The reservation wages of the CEO and the managers are equal. Arguably, the CEO has a higher reservation wage than the managers. This only increases the pay inequality and strengthens the results presented here.

when the output is $F+1$. Thus the pay inequality, when the output is $F+1$, is simply the difference between the CEO's payoff and the manager's payoff and is given by

$$\Delta_F = \frac{F}{4} - \frac{FR}{2} - \varepsilon \approx \frac{F}{4} - \frac{FR}{2}.$$

Since the probability of receiving $F+1$ under a skilled CEO is $Mg(n^*)$, the expected pay inequality if the incumbent continues as CEO till the end of the period is

$$E(\Delta_F) = \left(\frac{F}{4} - \frac{FR}{2}\right) Mg(\Sigma n^*(\delta)) \tag{1}$$

We can now proceed to characterize the optimal design of corporate governance and firm flatness.

B. Without Governance (δ=0)

In the absence of any threat of dismissal the CEO continues in office till the end of the period. To select his successor, he chooses among managers who have acquired firm specific skill. The number of potential CEO candidates depends on the number of managers who are provided access to headquarters in the beginning of the period. These potential candidates compete with each other and expend effort in non-productive activities to increase their chances of promotion. The managers effort in these activities influences the probability, $f_i = n_i$, with which he is viewed favorably by the CEO. In a symmetric equilibrium, each manager chooses n_i to maximize

$$\begin{aligned}
&n_i(1-n)^{F-1}E(\Delta_F) + {}^{F-1}C_1 n_i n(1-n)^{F-2}[\frac{1}{2}E(\Delta_F)+R] + \ldots + \\
&{}^{F-1}C_j n_i n^j (1-n)^{F-j-1}[\frac{1}{j+1}E(\Delta_F)+R] + \ldots + {}^{F-1}C_{F-1} n_i n^{F-1}[\frac{1}{F}E(\Delta_F)+R] + \\
&(1-n_i)(1-n)^{F-1}[\frac{1}{F}E(\Delta_F)+R] + (1-n_i)(1-(1-n)^{F-1})R - \frac{1}{2}k_n n^2
\end{aligned}$$

where $R = C_M + wB$ is the reservation wage. The maximization above assumes (1) that all managers who are viewed favorably have an equal chance of succeeding the CEO, (2) that in the absence of any favorable managers, all managers have an equal chance ($\frac{1}{F}$) of succeeding the CEO, and (3) that if not chosen as the CEO, managers pursue their outside opportunity. The first order conditions for the expression above is as follows and yields each manager's effort in counterproductive activities.

$$k_n n^* = \frac{E(\Delta_F)}{F}\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right] \tag{2}$$

In addition, managers incentive constraint to acquire skill is given by

$$\begin{aligned} c_s < \quad & n^*(1-n^*)^{F-1}E(\Delta_F) + {}^{F-1}C_1 n^{*2}(1-n^*)^{F-2}[\frac{1}{2}E(\Delta_F)] + \ldots + \\ & {}^{F-1}C_j n^{*j+1}(1-n^*)^{F-j-1}[\frac{1}{j+1}E(\Delta_F)] + \ldots + {}^{F-1}C_{F-2}n^{*F-1}(1-n^*)[\frac{1}{F-1}E(\Delta_F)] + \\ & {}^{F-1}C_{F-1}n^{*F}\frac{1}{F}E(\Delta_F) + (1-n^*)^F[\frac{1}{F}E(\Delta_F)] \end{aligned}$$

$$c_S < \frac{1}{F}E(\Delta_F) \tag{3}$$

The problem to maximize firm value can now be written as

$$\begin{aligned} Max_F \quad & Mg(F.n_F^*)(F+1) \\ & \text{such that} \\ & c_S < \frac{1}{F}E(\Delta_F) \end{aligned}$$

Proposition 1 *When governance is weak, the optimal number of managers(divisions) managed by the CEO is F* < N.*

Proof: See Appendix.

The proposition above captures the intuition that as the number of managers increase, the total counterproductive activities increase and consequently, at some point, the marginal benefit of adding one more manager is not high enough to outweigh the costs due to the increase in the total counterproductive activities. The increase in the total counterproductive activities merits some discussion. It is true that the lower probability of becoming the CEO, due to an additional manager, may reduce each manager's incentive to indulge in power struggles. However, the introduction of one additional manager also affects pay inequality. As the firm flatness increases, CEO power increases leading to greater pay inequality and hence greater power struggles. This ensures that the *total* counterproductive activities increase with firm flatness. Thus, even in the absence of any technological constraints that limit the degree of firm flatness, the optimal solution may not be the maximum number of possible managers. The result above is similar in spirit to the intuition in Holmstrom (1988) and Tirole (1986) as it suggests that vertical bureaucratic rules can be optimal under some conditions. We now proceed to the case when governance is strong and show how governance can reduce the costs associated with flattening the firm.

C. With Governance ($\delta = 1$)

With strong governance mechanisms in place, the CEO will now be dismissed if the probability of success under the rival's management is greater than the probability of dismissal under the incumbent's management. The incumbent is always preferred *ex ante* since he has firm specific skill that the rival lacks. However *ex post* the rival might be better if the incumbent has not performed. A reason, as an example, could be that the rival may have information that the incumbent lacks. By assumption (A3), the incumbent will be replaced if governance is strong ($\delta = 1$) and if the incumbent CEO does not take the right action. Even though only the CEO is dismissed, the replacement also effects the lower-level managers. Once the CEO

is replaced with an outsider rival, the managers lose their chance of becoming the CEO.[27] This in turn makes natural succession valuable to the managers and affects their incentives to indulge in counterproductive activities. We now solve for optimal degree of firm flatness (F) in the presence of strong governance.

Since managers can only become the CEO if the incumbent CEO is not replaced with an outsider (probability of incumbent continuing is $Mg(\Sigma n)$), they now maximize

$$Mg(n_i+\Sigma_{j\neq i}n_j)[n_i(1-n)^{F-1}E(\Delta_F)+{}^{F-1}C_1 n_i n(1-n)^{F-2}[\frac{1}{2}E(\Delta_F)+R]+...+$$
$${}^{F-1}C_j n_i n^j(1-n)^{F-j-1}[\frac{1}{j+1}E(\Delta_F)+R]+...+$$
$$(1-n_i)(1-n)^{F-1}[\frac{1}{F}E(\Delta_F)+R]+(1-n_i)(1-(1-n)^{F-1})R]+$$
$$(1-Mg(n_i+\Sigma_{j\neq i}n_j))R-\frac{1}{2}k_n n^2$$

where $R=C_M+wB$ is the reservation wage. Solving, as before, the first order condition for a symmetric equilibrium yields

$$n^*=M\frac{\Delta_F^G}{Fk_n}\left[g(Fn)\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]+\frac{\partial g(\Sigma n)}{dn}\right] \tag{4}$$

Since $\frac{\partial g(\Sigma n)}{dn}<0$ (see assumption A2) and $M<1$, $M\left[g(Fn)\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]+\frac{\partial g(Fn)}{dn}\right]<g(Fn)\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]$ and hence the optimal level of counterproductive activities is now lower than the level of such activities in the absence of governance. If $g(Fn)\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]+\frac{\partial g(Fn)}{dn}<0$, the optimal level of counterproductive activities is in fact 0.[28] For the remainder

[27] Note that the rival will acquire firm specific skills once in the firm and will hence continue in the next period. Another reason managers might dislike the arrival of a new CEO is that the target of their productive and counterproductive activities has left and these activities are therefore no longer useful.

[28] If the dismissal was not performance-based but simply introduced an outsider with a probability D, the first condition would be $k_n n=\frac{\Delta_F^G}{Fk_n}D\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]$ and hence the counterproductive activities would be lower than the case without any governance but always positive and higher than the scenario when the dismissal is performance-based. More importantly, such a scenario will also reduce the productive activities but a performance-based dismissal mechanism might, as we see later, increase the productive activities.

of the paper I assume that this condition holds.[29] This enables computation of closed form solutions without reversing any of the qualitative results. The assumption is stated below.[30]
If (A.4) $F - 2\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right] + \frac{\partial g(\Sigma n)}{dn} < 0$,
the optimal level of counterproductive activities is now

$$n^*(\delta = 1) = 0. \tag{5}$$

This leads to the main (and endogenous) benefit of strong governance mechanisms that is stated in the following proposition.

Proposition 2 *Performance based dismissal and replacement of a CEO with an outsider reduces the counterproductive activities associated with managerial competition to become the CEO.*

In equilibrium, the expected payoff to the manager on becoming the CEO is affected by both the internal structure of the firm and the presence of strong governance mechanisms. Before we proceed to characterize the the optimal governance and internal organization structures, we first analyze how this reward varies with different firm structures and governance strengths. The payoff on becoming the CEO is now different for two reasons. First, the CEO of a well governed firm is more likely to take the right action since his managers are less likely to indulge in power struggle activities. Second, the threat of dismissal increases the chances that an outsider will replace the incumbent. Consequently, a manager will acquire the necessary skills to become CEO if the following incentive constraint is satisfied.

$$c_S < Mg(n^*(\delta = 1))\frac{1}{F}E(\Delta_F(\delta = 1)) \tag{6}$$

[29]Generally, this condition is not sufficient to ensure that the optimal level of counterproductive activities is 0 if (1) the dismissal for poor performance is not certain or (2) the CEO requires information from only one of the managers to take the correct action. Nevertheless, the level of counterproductive activities will reduce in the presence of strong governance and the qualitative implications remain the same.

[30]If $\frac{d^2g}{dn^2} < 0$, then it is sufficient that $F - 2 + \frac{dg}{dn}|_{n=0} < 0$

Using (**??**) and (**??**), the problem to maximize firm value can now be written as

$$\begin{aligned} Max_F \quad & Mg(0)(F+1) \\ & \text{such that} \\ & c_S < Mg(0)\frac{1}{F}E(\Delta_F(\delta=1)) \end{aligned}$$

The solution is characterized by the following proposition.

Proposition 3 *When governance is strong, the optimal number of managers (divisions) managed by the CEO is N.*

Proof: See Appendix.

It is interesting to note that the incentive constraint can now be tighter than the corresponding constraint for weak governance if $M < g(F^* n^*(\delta=0))$.[31] This captures the potential cost of strong governance. Since strong governance increases the chances of an outsider replacement, insiders in the firm *may* now have a lower incentive to acquire the skills necessary to be CEO. The benefits of governance now have to be traded off with these potential costs to determine the optimal strength of the governance mechanisms. We can now characterize when strong governance and flatter firms ($F(\delta=1)=N>F^*(\delta=0)$) are desirable.

Proposition 4 *Strong governance and flatter firms are optimal as lower level managers become more important (higher M)*

Proof: See Appendix.

As the base level of managerial information (M) increases, the costs of governance reduce because of the fact that better information provides the CEO with higher bargaining power and hence a higher reward to the managers on becoming the CEO. Further, as circumstances of taking the wrong action reduce, there is a greater likelihood of natural succession.[32] At the same time, greater managerial importance also increases the benefits of governance as adding

[31] $g(0)$ is normalized to 1 so that M denotes the potential managerial impact in the absence of any activities.

[32] If investors use a relative evaluation criteria among similar firms, the second effect might not be important.

managers now, that was previously restricted due to the power struggle activities, has greater benefits.

D. Pay Inequality

After having characterized when governance and flatter firms are desirable, we can proceed to analyze the relative pay inequalities among firms that differ in governance and internal organization. The following proposition compares the pay inequalities between firms when both governance and internal organization are optimally designed.

Proposition 5 *Pay inequality and expected pay inequality are both higher in firms with strong governance (and flatter firms) than firms with weak governance.*
Proof: See Appendix.

We have seen earlier that strong governance and flatter firms are desirable when managers are important. The greater degree of flatness increases the CEO's bargaining power and hence increases the pay inequality. Further, since greater managerial importance increases the likelihood of success, the chances of receiving this higher pay inequality are also greater. Thus, in addition to governance, the internal organization of the firm will be associated with pay inequality in firms and consequently might be a useful tool to differentiate between CEOs who are paying themselves too much and CEOs who are value maximizing. One would expect high pay inequality observed in combination with vertical firms to be a more likely symptom of excessive CEO pay than when the high CEO pay is associated with a flat firm.

IV. Extensions

Before proceeding to relate the framework to the empirical patterns, I discuss some extensions and robustness of the earlier results.

A. Productive Managerial Competition

So far, the paper focuses only on the counterproductive activities due to managerial competition to become the CEO. In this subsection, I consider the the joint design of corporate governance and internal organization, if in addition to the counterproductive activities (n), managerial competition also enjoins productive activities (p).

As before, the CEO uses signals generated by managers to select among managers who have had access to the CEO and he views a manager favorably with probability f. To capture the notion that both productive and counterproductive activities are now helpful, the probability with which a manager is viewed favorably is $f = w_n n_i + w_p p_i$. Without further changes to the framework presented in the previous section, we can now analyze the joint design of corporate governance and internal organization in the presence of both productive and counterproductive activities.

Proceeding as in the case with only counterproductive activities, we can solve for managerial effort in productive and counterproductive activities under the two scenarios of weak and strong governance. In in the absence of strong governance, the manager's effort in counterproductive and productive activities is given by

$$n_F^* = \frac{w_n E(\Delta_F)}{F k_n} \Sigma_{j=0}^{F-2} (1-f^*)^j$$
$$p_F^* = \frac{w_p E(\Delta_F)}{F k_p} \Sigma_{j=0}^{F-2} (1-f^*)^j$$

In the presence of stong governance, these productive and counterproductive activities are given by the following equations

$$n^* = \frac{ME(\Delta_F)}{F k_n} \left[w_n g(Fp, Fn) \Sigma_{j=0}^{F-2} (1-f^*)^j + \frac{\partial g(\Sigma p, \Sigma n)}{dn} \right]$$
$$p^* = \frac{ME(\Delta_F)}{F k_n} \left[w_p g(Fp, Fn) \Sigma_{j=0}^{F-2} (1-f^*)^j + \frac{\partial g(\Sigma p, \Sigma n)}{dp} \right]$$

As seen earlier, the counterproductive activities are lower in the presence of strong governance. The productive activities in the presence of strong governance can however be lower or higher than the case without governance depending on whether $M[w_p g(Fp,Fn)\Sigma_{j=0}^{F-2}(1-f^*)^j + \frac{\partial g(Fn,Fp)}{dp}] < (\text{or} >) 1$. From this inequality, it is clear that productive activities are more likely to higher in the presence of strong governance than in the case of weak governance as managerial impact on performance (M and $\frac{\partial g(Fn,Fp)}{dp}$) increases. Using assumption (A.4), strong governance increases the productive activities if

$$M[g(0,Fp)\Sigma_{j=0}^{F-2}(1-f^*)^j + \frac{\partial g(0,Fp)}{dp}] > 1$$

Thus, the conditions that make strong governance desirable (greater managerial impact) - higher M and higher $\frac{\partial g(0,Fp)}{dp}$ - also increase the productive activities. This increases the benefits of strong governance highlighted in the previous section by not only reducing counterproductive activities but also increasing the productive activities relative to the case with no governance. The following proposition formalizes this while also noting that the costs of stronger governance (lower managerial incentive to acquire skill) also reduce.

Proposition 6 *In the presence of both productive and counterproductive activities, strong governance is accompanied with flatter firms. The costs associated with governance are now lower and finally, for high managerial impact (M and $\frac{\partial g(0,Fp)}{dp}$) strong governance now has greater benefits than in the case with only counterproductive activities.*

Proof: See Appendix.

As managerial impact increases, a higher productive effort translates into a lower probability of CEO dismissal and hence a higher probability of natural succession where the manager has a higher chance of becoming the CEO. Thus, as managerial impact increases, the marginal benefit of increasing the productive effort is higher than the marginal cost of this effort. This

provides the intuition as to why managers increase productive effort in the presence of governance. This higher productive effort not only increases the likelihood of natural succession, and hence the manager's chances of becoming the CEO but, in equilibrium, also increases the expected pay that the CEO gets. Thus, managers now have a higher incentive to acquire skill required to become the CEO. Consequently, strong governance now also reduces the costs associated with governance.

Thus, the conditions that earlier, in section 3, were found to make strong governance desirable (greater managerial impact) also increase the productive activities. This increases the benefits of strong governance highlighted in the previous section by not only reducing counterproductive activities but also increasing the productive activities relative to the case with no governance. Thus the introduction of productive activities only makes strong governance and flatter firms more desirable as managers have a higher impact on firm performance. We can now also see why performance-based dismissal is important. If the dismissal is not performance-based, such mechanisms would always reduce productive activities.

Finally, within this framework of productive and counterproductive activities, it is also useful to briefly discuss an alternative mechanism for the design of CEO pay. An alternative source of CEO pay inequality motivated by the theory on tournaments (Lazear and Rosen (1981), Rosen (1989)) is to incentivize lower-level managers. A vast literature, following Lazear and Rosen (1981), has viewed promotion as an incentive device. In what follows, I briefly discuss the sensitivity of the results if the CEO's pay was designed by the shareholders to motivate the lower-level managers, rather than through bargaining between the CEO and the shareholders.

The main results presented in this paper are unchanged even if this alternative mechanism is used for determining CEO pay. I provide a brief outline of why. Since pay inequality is now part of the design problem rather than the outcome of governance and internal organization choices, when governance is strong and there are no counterproductive activities, the pay inequality can be increased to its maximum possible level. In the absence of strong gov-

ernance, pay inequality is however designed to be lower since a higher pay inequality now increases counterproductive activities as well. While the increase in pay inequality associated with strong governance increases the incentive for manager's to work more, the threat of performance-based replacement of the CEO with an outsider lowers this incentive. As seen earlier, when managerial impact on firm performance is high the latter effect is weak and hence for high managerial impact, strong governance, flatter firms and higher pay inequality is optimal.

B. Insiders versus Outsiders

Governance, so far, has been characterized by two features - (1) performance-based dismissal that increases the likelihood of (2) outsider replacement (or conversely reduce the likelihood of insider succession). In this subsection, I discuss the optimal choice of CEO replacement in cases of forced dismissals.

If performance-based CEO dismissals increase the probability of insider replacement rather than outsider replacement, the benefits of governance discussed earlier do not exist. Managers are now not only more likely to become the CEO but are also more likely to become the CEO sooner. Thus, if the incumbent CEO's input for the choice of successor is still valued (and this might not be), counterproductive power struggle activities are now likely to increase. Even if the incumbent CEO input is not valued, the higher chance of a promotion due to CEO dismissal increases managers' incentives to get the CEO dismissed.[33] This decreases the cooperation between the CEO and the lower-level managers and gives rise to inter-layer counterproductive activities.

However, before we conclude that insider replacement is therefore exacerbating the managerial power struggles and is hence suboptimal, it is also necessary to see whether managerial incentives to acquire skill are higher due to the greater likelihood of becoming the CEO. This

[33]Interestingly, then strong governance with insider replacement might make firms less flatter since CEO choose to expose themselves to only a few managers.

might not be the case because a CEO in such a firm is more likely to make mistakes. Consequently, the CEO is more likely to be dismissed leading to a lower expected reward for the manager on becoming the CEO. To analyze this, I write below the managerial incentive constraint when an insider is chosen to replace the CEO.

$$c_S < Mg(Fn^*,0)\frac{1}{F}[E(\Delta_F(\delta=1))] + (1-Mg(Fn^*,0))\frac{1}{F}[E(\Delta_F(\delta=1))]$$

where n^* now denotes the optimal level of interlayer counterproductive activities. The first term, similar to the expression in (**??**) is the payoff to a skilled manager if the incumbent CEO continues and the second term is the payoff if the CEO is dismissed. Note that the firm value in the short term after replacing the CEO is the same as the firm value under a rival. This is because of the assumption that the manager's skill is only realized in the next period, making the the outsider candidate and the insider candidate identical.[34] Thus differences in preferring an internal candidate over an external candidate or vice-versa arise only from the effects on managerial incentives. The expression above can be simplified to

$$c_S < \frac{1}{F}[E(\Delta_N(\delta=1))] = \left(\frac{1}{4}-\frac{R}{2}\right)Mg(Fn^*,0).$$

Comparing this with the incentive constraint when strong governance is accompanied with an outsider replacement ($c_S < Mg(0,Np^*)^2\frac{1}{N}E(\Delta_N(\delta=1))$), the incentive to acquire skill increase only if

$$g(0,Np^*)^2 < g(Fn^*,0).$$

As managerial impact on firm performance increases, this condition is less likely to be satisfied since p^* increases with M (proposition 6), thus increasing $g(0,Np^*)$. If an insider is used to replace the CEO in case of a forced dismissal, the benefits of reduced power struggle activities do not exists and, when managers are important, the costs of a threat of dismissal are high as well. On the contrary, if the dismissal threat uses an outsider, the benefits of reduced power

[34] Since skill is not required in the short term the incentives to acquire skill do not depend on *S*.

struggle activities are high and the costs of lower managerial incentive to acquire skill are low precisely when managerial importance is high. Therefore, if a threat of performance-based CEO dismissal were to be used, it is optimal for such a threat to be accompanied by a commitment to use an outsider.

Governance mechanisms such as hostile takeovers, and hence a lack of takeover defenses, automatically satisfy these conditions. Similarly, bankruptcy and liquidation due to a large amount of debt would also generate similar results. Note however that other governance mechanisms such as a strong board of directors might not always satisfy the second condition.[35] A large fraction of outside directors on the board might provide such a commitment. Similarly, the existence of CEO head hunting firms might also provide the necessary threat.

C. The Impact of CEO Skill

To see how the optimal design changes as firm-specific skill required to be the CEO changes, we can alter the value of the firm under the rival, S. As S increases, firm specific CEO skill becomes less important. The exogenous benefit from replacing the CEO with an outside rival, S, was so far taken to be negligible. This allowed us to focus on the endogenous benefit of strong governance mechanisms.

However, for a fixed level of managerial importance (M), as CEO skill becomes less important, the exogenous expected benefits of replacing the CEO - $(1-Mg(Fn))S$ - increase. At the same time, as CEO skill becomes less important, the pay inequality (from section III.A, pay inequality is $\frac{F}{4}-\frac{FR}{2}-S$) decreases. This reduces counterproductive activities. The decrease in these power struggle activities implies a decrease the endogenous benefits of strong governance mechanisms. The cost of strong governance (lesser incentives to acquire skill) also become less important since skill is less important. Thus as firm specific CEO skill decreases, managerial power struggles reduce and strong governance is now more desirable not so much

[35] Hermalin (2003), however, shows that a stronger board is associated with a greater chance of outsider replacement

because it reduces the power struggles but mainly because the expected benefits of CEO replacement are higher. In sum then, firms where firm-specific CEO skill is not important would have strong governance and flatter firms.

D. Forms of External Control

D.1. Governance, Competition and Labor Market Mobility

Product market competition is often viewed as a mechanism that controls inefficient managerial activity (see e.g. Alchian (1950), Stigler (1958), Hart(1983)).[36] The framework here supports the traditional view that competition in combination with debt can make firms efficient. Distress can cause CEO and management dismissal and hence have the same effect as shareholder induced dismissal. This suggests that higherr debt will be more likely to be associated with flatter firms in competitive industries.

More closely related to the specific inefficiency analyzed here, the model provides a novel channel through which governance improvements in one firm can enable other similar firms to restructure. The essence of how governance interacts with competition is that the presence of strong governance (replacement of the CEO with a greater likelihood of outsider succession) increases the chances of top management managers to move within firms. This effect is likely to be stronger in industries characterized by a greater competition for labor.[37] The greater number of inter-firm transfers to a higher level now affects the incentives of managers in each firm since it creates new opportunities for them outside their own firm.

To see this in the framework presented here, consider an industry with two firms that are identical except in their governance and internal organization choices. Let the probability with which a manager can find a position as a CEO in another firm be θ. θ will not only be

[36] See Allen and Gale (2000) for a review.

[37] This effect will also be stronger in industries with greater product market competition if firms competing in the product market also compete in the labor market.

a function of the number of similar firms but also of the governance standards in those firms. To emphasize the effect of the industry's governance standards on a firm *i*, let us consider the change in a firm's internal organization in response to a change in its competitor's (firm *j*) governance. While this is a partial equilibrium view, it provides the main intuition of how governance and competition interact.

I first consider the case when both firms have poor governance and there is no chance of an outsider replacing the incumbent CEO. For simplicity, I focus only on the counterproductive activities. Then the manager in firm *i* can become the CEO in only his own firm. The problem then is the same as the one analyzed earlier in section 3.

If however, firm *j* has strong governance, with probability $(1-Mg(0))$, the CEO in firm *j* will be replaced with an outsider. Assume that there are F managers in firm *i*, then each manager has a probability of becoming the CEO with probability $\theta = \frac{1-Mg(0)}{F}$. Thus managers of firm *i* consider this scenario to maximize

$$
\begin{aligned}
&(1-\theta)[n_i(1-n)^{F-1}E(\Delta_F) + {}^{F-1}C_1 n_i n(1-n)^{F-2}[\frac{1}{2}E(\Delta_F)+R] + \ldots + \\
&{}^{F-1}C_j n_i n^j (1-n)^{F-j-1}[\frac{1}{j+1}E(\Delta_F)+R] + \ldots + {}^{F-1}C_{F-1} n_i n^{F-1}[\frac{1}{F}E(\Delta_F)+R] + \\
&(1-n_i)(1-n)^{F-1}[\frac{1}{F}E(\Delta_F)+R] + (1-n_i)(1-(1-n)^{F-1})R] + \\
&\theta[R+E(\Delta_N(\delta=1))] - \frac{1}{2}k_n n^2
\end{aligned}
$$

where θ is the probability with which the manager becomes the CEO of firm *j* with strong governance and N managers. The first order conditions for the expression above yields

$$
n^* = \frac{(1-\theta)E(\Delta_F)}{Fk_n}\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]
$$

Since $\theta > 0$, the counterproductive activities reduce thereby enabling the current firm to become flatter in spite of weak governance. The following proposition summarizes this result.

Proposition 7 *In an industry with homogenous firms, strong governance in some firms may allow the CEOs of the weakly governed firms to flatten their firms.*

This proposition shows how even when a firm has poor governance, the improvement in governance standards in other similar firms can reduce managerial effort in counterproductive activities and enable flattening of the firm and provides an explanation for 'voluntary' restructuring by firms with poor governance. Kaplan and Holmstrom (2001) note that "nearly half of all major U.S. corporations received a takeover offer in the 1980s–and many companies that were not taken over responded to hostile pressure with internal restructuring that made themselves less attractive targets."

D.2. Financial Constraints

The framework presented here ignores control that shareholders can exercise through the financing channel. The implicit assumption was that financing was done at the beginning of the period for a profitable project. Let us now assume that the firm has weak governance mechanisms but is required to raise financing at the beginning of the period as well as at the intermediate stage when the CEO takes an action. Examples of such staged financing are common in venture capital backed firms (Sahlman (1990)), where each round of financing is accompanied by the release of new information about the venture. In such a case, nonproductive activities by the manager increase the chances that the project will be liquidated. This would be tantamount to a collective dismissal of the entire top management. Therefore financial control can substitute for governance mechanisms and firms with greater financial constraints will be flatter. A complete analysis of how financing policy and cash policy interact with internal organization is beyond the scope of this paper.

E. Robustness - Performance based Pay

I show how governance can help to reduce the counterproductive activities of managers and hence enable flattening of the firm. A natural question arises - Why not use other mechanisms, especially performance-based pay, to address these counterproductive activities? I first address the use of performance-based pay, an example of which is awarding shares in the firm. Clearly, such compensation packages will reduce counterproductive activities. However, their scope in doing so will be limited as long as CEO pay is higher than managerial pay. Further, the framework suggests that if performance-based pay is indeed used to *partly* address these concerns, then abstracting from governance, managers in flat firms would have greater stock ownership and lower cash salaries than managers in vertical firms. This is consistent with evidence in Rajan and Wulf (2003) who document that salaries at low levels in flatter firms are lower than in comparable positions in a tall organization while managers in flatter firms have a higher ownership stake than their counterparts in vertical firms.

Another mechanism that has been suggested to control these activities is to reduce interference by superiors in making decisions that have little impact on firm value but that is important for the juniors (Milgrom and Roberts, 1988). The choice of a future CEO is an important decision for the firm. Reducing incumbent CEO interference in this decision is difficult since the incumbent CEO is the one who is likely to have the most information on the CEO candidates. Consequently, this mechanism is less likely to be of use in the context of CEO succession.[38] At the level of generality at which counterproductive activities are analyzed here, it is difficult to think of one mechanism that mitigates the costs associated with all these activities. I, however, note that governance only addresses residual counterproductive activities.

[38] Yet another channel through which these counterproductive activities might have limited costs for the firm is if the CEO does not rely on information from the managers (Milgrom and Roberts (1986). However given that all parties have information strong governance would allow a more decentralized decision making process.

V. Empirical Implications

A. Explaining the trends

The paper has jointly designed corporate governance and the internal organization of firms to show that flat firms and strong governance is optimal when lower level managers are more important. Also, the pay inequality in firms with strong governance and flat structures is shown to be higher than in vertical firms and weak governance (Proposition 5). While several factors have changed over the last two decades, these propositions shed light on the three trends - greater shareholder activism, flatter firms and higher pay inequality.

Changes over the last two decades in the means of acquiring information and the higher ability to process this information have contributed to an increasing importance of lower-level managers. Specifically, developments in the field of information technology, which began in the late 70's, have lowered costs of acquiring and processing information.[39] A few examples of such changes are the development of expert systems, electronic detection devices and codification allowed by computers. Such changes, that have enabled lower-level managers to be more informed and hence more important have increased the benefits and lowered the costs of strong governance mechanisms. Consequently the optimal structure has changed from vertical firms and weak governance to flat firms and strong governance and higher pay inequality. Therefore, developments in information technology endogenously give rise to the three aforementioned trends.

In addition an increase in managerial importance could be due to a changing nature of work. A trend towards involving less specialized job assignments, more team work, and more intensive communication suggests an increased importance of lower-level managers.[40]

[39] See Jensen(1993) for a discussion of the impact information technology on finance. Also see Bresnahan et. al. (2002) for the impact of information technology on workplace organization.

[40] See Dessein and Santos (2003) and the references therein. Dessein and Santos (2003) provide a framework to understand how globalization and information technology have contributed to this change.

The framework also suggests that governance not only enables firms to become flatter but also enables firms to become bigger, through the reduction of counterproductive activities associated with a greater number of lower-level managers. Several industries, such as Air Transport, Broadcasting, Entertainment, Natural Gas, Trucking and Transport Leasing experienced major federal deregulation in the late 1970s and the early 1980s (Mitchell and Mulherin (1996)). Such changes not only removed artificial barriers to firm size but also increased entry by new firms. Thus, the framework suggests that these expansion opportunities increase the beneficiary role of strong governance and increased strong governance with greater pay inequality. The framework also suggests that a changing competitive environment can affect these patterns - greater competition will enable firms to become flatter due to not only a greater threat of bankruptcy but also due to the greater labor market mobility. Deregulation - by promoting the entry of firms - and the opening up of international markets has probably also contributed to a more competitive environment. Therefore deregulation also plays a role in generating the three trends.[41]

Two other papers shed light on two of these trends - flatter firms and higher pay inequality in the top management. Garicano and Rossi-Hansberg(2003) investigates how developments in information technology influence firm organization in the absence of incentive problems. They show that the if information technology has primarily lead to a reduction in the costs of acquiring information, one could use information technology to justify the two trends of flatter firms and greater pay inequality. The framework presented here shows that power struggles can force a firm to deviate from its first best structure and that strong governance can enable the firm to return to the optimal structure. Interestingly, as in Garicano and Rossi-Hansberg (2003) , one of the factors that makes governance optimal and firms flatter is increased managerial importance through lower costs of acquiring information. Consequently, introducing incentive problems reinforces the two trends that accompany the first best structure and also generates the third observed trend of greater shareholder activism.

[41] Note that, in the 1990s much of the takeover and restructuring activity was again in industries going through regulatory changes, most notably the banking and finance sector.

One could also appeal to Rajan and Zingales (1998, 2001) to explain the two trends of flatter firms and higher top management pay inequality. As expropriation opportunities increase, either due to greater access to capital or due to the human capital intensive nature of work, it is now optimal to have flatter firms. Flatter firms reduce the positional power that lower level agents have and hence reduce the chances that they walk away from the firm with their juniors. However, in order to make them specialize now, it is also important that they be given a prize - future ownership. Thus firms will be flatter and pay inequality higher as expropriation by managers is a bigger concern. A contribution of this paper to highlight the friction that is associated with the choice of future head, an issue not considered in Rajan and Zingales (1998, 2001). As with Garicano and Rossi-Hansberg (2003), introducing this effect not only reinforces the two outlined trends but also generates a role for greater shareholder activism.

B. Other Implications

Prior clinical work, such as Baker and Wruck (1990) and Wruck (1994), documents a connection between value creation and the nature of a firm's governance structure, organizational design, and compensation systems. Kaplan, Mitchell and Wruck (2000) identify organizational changes as a key factor contributing to the success (or failure) of a merger. These papers show that there is a link between external finance and the internal organization of the firm - that is made clear by concomitant financial and organizational restructuring.[42] The framework presented here provides a theoretical justification for this link. It also generates several cross sectional implications that I list here in three categories.

A. Governance, Internal Organization and Pay

We have noted that strong governance is associated with flatter firms, especially if governance is used to lower power struggles. However, as firm-specific CEO skill is less important,

[42] For a description of recent trends in corporate organization see Holmstrom and Kaplan(2001). For a case to jointly study organizational boundaries and external finance, see Zingales (2000).

strong governance becomes desirable simply due to the benefits of CEO replacement. Thus the link between governance and firm flatness will be stronger when firm-specific skill is more important. This link will also be stronger in concentrated industries (see proposition 7).

In the context of the framework, the pay inequality depends on the number of managers with access to the CEO, corporate governance and the firm specific skill. The pay inequality is higher in flatter firms, as governance is stronger and as firm-specific skill is higher. Consistent with this, Rajan and Wulf (2003) find that pay inequality is higher when the number of managers reporting to the CEO is higher.

B. Other forms of control

Section 5 briefly discusses the impact of alternative control mechanisms to correct for managerial inefficiencies. The discussion suggests that, due to the threat of bankruptcy, high debt is associated with greater flatness in competitive environments. Similarly, firms that are financially constrained or rely or staged financing are more likely to be flat. In the context of venture backed firms discussed earlier in section 4.D.2., this suggests that firms that are venture capital backed will be flatter.

C. CEO Succession

A precondition for forced turnovers is the presence of strong governance mechanisms. While the framework suggests that strong governance mechanisms are more likely to be accompanied by flat firms, it is not clear if forced dismissals are higher in flat firms. Since the threat of dismissal is less likely to be exercised in flat firms relative to vertical firms, a regression relating the probability of CEO dismissal (p(dismissal)) to governance (δ) and firm flatness (F) would be of the form

$$p(dismissal) = \alpha_1 \, \delta + \alpha_2 \, \delta \times F$$

where $\alpha_1 > 0$ and $\alpha_2 < 0$.

Given forced dismissals however, the framework suggests that an outsider replacement is more likely if the firm is flat and insider replacement is more likely when the firm is vertical.

D. Labor Market Mobility

Labor market mobility can reduce intra-firm career concerns of top management managers by creating opportunities for pursuing career opportunities in different firms - thus leading to lesser power struggles and hence greater degree of firm flatness. This suggests that economies where labor markets are mobile will be characterized by flatter firms and that firms in homogenous industries are more likely to be flat. It also suggests that cases of 'voluntary' restructuring in response to governance changes in other firms will be higher when the industry is characterized by greater labor market mobility.

VI. Conclusion

This paper analyzes the joint design of corporate governance and internal organization of firms. In the model presented here, internal organization determines the access that managers have to headquarters. Greater access to headquarters allows the managers to accumulate skills that are required to be the Chief Executive Officer (CEO). If selected as the future CEO, this gives them power to bargain with the shareholders (Rajan and Zingales, 1998). However, the selection process involves intra-firm managerial competition ('power struggles') that results in not only productive activities but also in counterproductive power struggles.

Strong governance mechanisms are characterized by performance-based CEO dismissal. It is shown that such dismissals are more likely to use outsider replacement of the CEO and have both benefits and costs. Strong governance mechanisms exaggerate the positive aspects of competition while reducing these counterproductive activities allowing the CEO to 'empower' many managers. However, the chance of an outsider replacement may also reduce manager's incentives to acquire skill. Governance and internal organization is optimally designed to

balance these effects. As managerial importance increases, strong governance and flatter firms become more desirable.

The framework jointly explains three trends that have characterized the American economy over the last two decades - greater shareholder induced CEO turnover, flattening firms and steeper pay differentials in organizations. This paper presents a theoretical step in explaining why external control and internal organization are related. I focus on control exercised through the dismissal mechanism. A more complete version of such a theory promises to generate implications on how the internal organization of a firm is linked to the financing decisions and cash policy of the firm.

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Appendix - Proofs

Proof of Proposition 1: *The objective is to maximize* $Mg(Fn^*)(F+1)$. *The difference in values between a firm with F+1 managers and F managers can be written as* $M[g((F+1)n^*(F+1))+(F+1)(g((F+1)n^*(F+1))-g(Fn^*(F))$. *Now, to show that there exists an internal optimal solution, it suffices to show that* $g((F+1)n^*(F+1))$ *is lower than* $g(Fn^*(F))$ *(this ensures that the difference above will become negative for some* $F > F^*$*) or, equivalently, that* $(F+1)n^*(F+1)$ *is higher than* $Fn^*(F)$. *I proceed to prove by contradiction and assume that* $Fn^*(F) > (F+1)n^*(F+1)$.

*If this is true, from (**??**), since* $g((F+1)n^*(F+1)) > g(Fn^*(F))$,

$$\frac{E[\Delta(F+1)]}{F+1} > \frac{E[\Delta(F)]}{F} \tag{7}$$

Also $(F+1)n^*(F+1) < Fn^*(F)$ *implies that*

$$n^*(F) > n^*(F+1) \tag{8}$$

*From (**??**), this means that*

$$\frac{E(\Delta(F+1))}{F+1}\left[\Sigma_{j=0}^{F-1}(1-n^*(F+1))^j\right] < \frac{E(\Delta(F))}{F}\left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]$$

*From (**??**), this implies that*

$$\left[\Sigma_{j=0}^{F-1}(1-n^*(F+1))^j\right] < \left[\Sigma_{j=0}^{F-2}(1-n^*)^j\right]$$

*However, from (**??**), this cannot be true. Hence,* $(F+1)n^*(F+1) > Fn^*(F)$. *Further, since* $F+1n^*(F+1) > Fn^*(F)$, *the incentive constraint becomes tighter as F increases. Thus there exists some* $F^* < N$ *that maximizes the firm value.*

Proof of Proposition 3: *From (**??**), the right hand side of the constraint is simplified to* $(\frac{1}{4}-\frac{R}{2})M^2$ *and is independent of* F*. Also, since* $n^*=0$*, the objective function is increasing in F. Therefore the optimal solution is to set* F *to its maximum value* N*.*

Proof of Proposition 4: *In the interesting case where the manager acquires skill in atleast one of the two possible scenarios (weak and strong governance) and hence creates a role for dismissal and succession choices, let us compare the benefits and costs. The incentive constraint in the presence of strong governance is* $c_s < M^2(\frac{1}{4}-\frac{R}{2})$*. If this is satisfied, strong governance generates the maximum possible value and hence is optimal. Thus when M is high, strong governance and flatter firms are optimal. If this constraint is not satisfied, the value of the firm is the value under the rival's management (who lacks firm specific skill) which from before is set to a number close to 0 (*ε*). Thus if this constraint is not satisifed, weak governance is optimal provided the incentive constraint is satisfied, This will happen if* $M < \frac{c_S}{M(\frac{1}{4}-\frac{R}{2})} < g(F^*(\delta=0)n^*)$*.*

Proof of Proposition 5: *We can use (**??**) to characterize pay inequality in the different optimal scenarios. In optimally designed governance and firm structures for* $M > M*$ *where* $c_s = M^*2(\frac{1}{4}-\frac{R}{2})$*, the pay inequality is* $(\frac{N}{4}-\frac{NR}{2})$ *and the expected pay inequality is* $M(\frac{N}{4}-\frac{NR}{2})$*. In firms, with weak governance and* $F=F^*<N$*, the pay inequality is* $(\frac{F^*}{4}-\frac{F^*R}{2})$ *and the expected pay inequality is* $Mg(n^*)(\frac{F}{4}-\frac{FR}{2})$*. From proposition 1, pay inequality is thus greater in firms with strong governance and from proposition 2, the expected pay inequality is higher in these cases as well.*

Proof of Proposition 6: *Since, the counterproductive activities are now lower and, by assumption (A.4) equal to 0, it is always optimal to use the maximum number of managers*

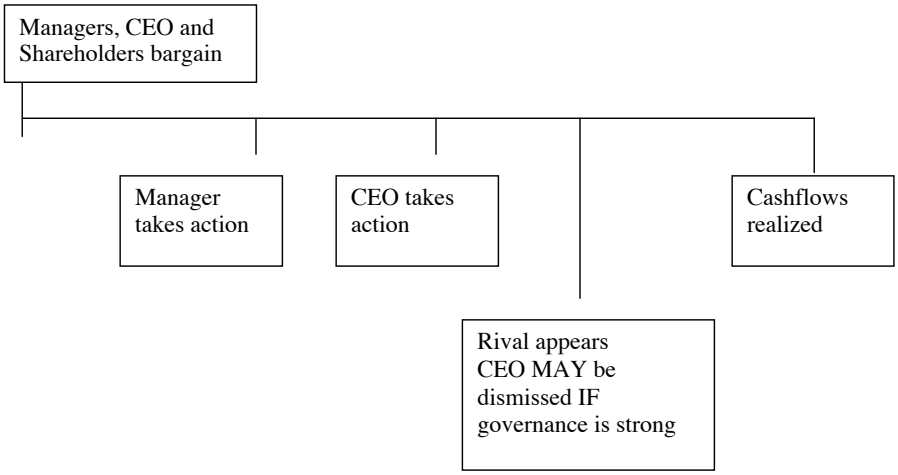
($F = N$) in the presence of strong governance. To see whether strong governance is now associated with more or less costs, first note that the incentive constraint is now

$$c_S < Mg(0, Np)^2 \frac{1}{N} E(\Delta_N(\delta = 1))$$

For a given M, this is more likely to be satisfied than the earlier incentive constraint of $c_S < Mg(0)^2 \frac{1}{N} E(\Delta_N(\delta = 1))$ *since* $g(0, Fp) > g(0,0)$ *and the expected pay inequality, a function of* $g(.)$ *is now also higher. We have already seen that as M increases, the productive activities increase, thus increasing the benefits of strong governance to not only a reduction in the counterproductive activities but also an increase in the productive activities.*

FIGURE 1

TIMELINE OF EVENTS EACH PERIOD



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