

Understanding an Emergent Diversity  
of  
Corporate Governance and Organizational Architecture

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# **Understanding an Emergent Diversity of Corporate Governance and Organizational Architecture**

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## **Abstract**

This article proposes a simple model to interpret the diverse linkages between corporate governance (CG) and organizational architecture (OA). Our framework compares diverse OA based on three elements: managers' human assets (MHA), workers' human assets (WHA), and non-human assets (NHA). Using the concept of essentiality proposed by Hart (1995), we identify four modes of CG-OA linkage that correspond to the traditional Anglo-American, German, Japanese and Silicon Valley models. We also propose that a distinct OA-CG mode may characterize the path dependent emergence of a new hybrid pattern of CG in Japan, and examine its both its empirical characteristics and future viability in light of possible institutional complementarities.

## **JEL Classification Index:**

G34 – Corporate Governance; D02 – Institutions; P51 – Comparative Analysis of Economic Systems; D23 - Property Rights; J24 – Human Capital; Z13 – Economic Sociology

## **Keywords:**

Corporate governance, essentiality, human assets, institutional change, organizational architecture, path dependence.

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## 1. INTRODUCTION

The standard view of the corporate firm in economics is that of a hierarchical series of principal-agency relationships. The architecture of the internal organization is viewed as a nested hierarchical structure composed of the principal-cum-supervisor and the agents-cum-subordinates, within which the authority of decision-making is delegated from the former to the latter only within a contractual limit. The top management of the internal organization is considered as the agent of the investors who exercise their control through the financial market (and the board of directors) within the orbit of the legal setting. In essence, corporate governance is simply viewed as dealing with “the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment” (Shleifer and Vishny, 1997). However, we argue that there are various patterns of linkage between corporate governance (CG) mechanisms (institutions) and organizational architecture (OA) as a non-market information system, the workings and implications of which cannot be adequately understood in terms of the standard framework. In this paper, we propose a simple framework for classifying distinct patterns of the linkage between CG and OA by specifying basic conditions for each of them to be viable and speculating on a possible reason for the emergence of a new pattern.

One possible conceptual and analytical approach to the linkage between CG and OA is to treat the corporate firm as the domain of a game between the manager, the workers and the investors (of various types) and regard a stable linkage between a particular type of CG and OA as an instance of equilibrium outcome of strategic interplay among those players. There can be multiple equilibria even for a simple structure of the game, out of which the selection may be conditioned by the values of institutional parameters surrounding the domain of the game (the exogenous rules of the game). The formal rules of law, institutional organization of market processes, business-government relationship and prevailing social norms may be reckoned as constituting such parameters. By incorporating the workers as explicit players of the game alongside the investors and the managers (and further introducing the government and various types of market participants as possible parameters), this approach may be regarded as an attempt to operationalize the so-called “stakeholder” view of CG.<sup>1</sup> On the other hand, it also anticipates the conventional property-rights-based control of organizational hierarchies as one particular equilibrium, out of many that are possible under certain conditions. This equilibrium solution corresponds to the standard, “corporations-as-property-of-investors” view. Thus, the game-theoretic view may be regarded as a more general approach that treats the traditional debate between the two views from a higher level and reconstructs the standard perspective as a special case.

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<sup>1</sup> See also Aguilera and Jackson 2003.

One of the present authors developed a fairly elaborated game-theoretic approach to the linkage between CG and OA in a previous writing (Aoki, 2001, particularly Part III). There he identified four modes of stable equilibrium linkage between CG and OA: property-rights-based control of organizational hierarchies, codetermination and workers' participation in work-site control, relational contingent governance of the team-like OA, and the venture capitalist governance of tournament among entrepreneurial start-up firms. As easily inferred, these four modes of CG-OA linkages may be considered as representing embryonic models of the traditional Anglo-American, German, Japanese and Silicon Valley institutions, respectively.

Building on the results of previous comparative equilibrium analysis, this paper proposes a very simple way of characterizing the basic nature of OA corresponding to each of the four modes of linkage. The building blocks for such OAs are composed only of assets held by basic stakeholders: manager's human assets, workers' human assets, and investor-supplied non-human (physical/financial) assets. The equilibrium modes of linkage can be distinguished only in terms of combinatorial relationships among those assets: complementarities and essentiality under certain conditions originally introduced by Hart (1995). This simplified approach turns out to be rich enough to capture essential differences among the above-mentioned four modes *plus* one more possible mode.

One possible utility of this approach is to identify and interpret the nature of institutional change related to the CG-OA linkage. Even though the preceding four modes can be captured as equilibrium phenomena in a snapshot manner, they should never be taken as frozen objects. Actual institutions originate and evolve in a historical fashion, where initial conditions, power relationships, technological development, and sequences of events play an important role (Aoki 2001, Ch. 10; Thelen 1999). Indeed, prompted by the global integration of markets and the development of information technology, CG institutions and their corresponding OA are being subjected to continual and gradual changes through mutual interactions, learning, legal design, and various political and corporate events. Will these changes eventually lead to a convergence of in the mode of CG-OA linkage, or alternatively to the evolution of each to a new mode? In the second part of this paper, we will present a result of cluster analysis that identifies emergent changes in the patterns of CG-OA linkage in Japan. Then using the framework developed in the first part, we discuss whether emergent patterns signal gradual convergence to the market-control of internal hierarchies of the Anglo-American type or the evolution of a possibly new mode in a path-dependent manner.

## **2. Elementary Modes of CG-OA Linkage**

Let us simply assume that the domain of the (corporate) firm is composed of the manager, the workers and investors. To differentiate and identify the characteristics of the four equilibrium modes of CG-OA linkage in the simplest terms, let us envision that the building blocks of OA are simply composed of three elements: manager's human assets (MHA), workers' human assets (WHA), and

investor-supplied non-human assets (NH). In the literature, the firm-specificity of WHA is sometimes referred to as a key notion for specifying the nature of CG and/or OA. For example, the “board-as-the-trustee-of-stakeholders” view by Blair and Stout (1999) highlights such notion. Some others refer to complementary relationships between MHA and WHA as an important defining factor of CG-OA linkage. For example, Rajan and Zingales (2000) points to their growing importance in refuting the relevance of property rights in NHA for understanding the nature of an emergent CG mode. Although those views have substantial merits for understanding some aspects of diversity of CG-OA linkage, we would argue that the firm-specificity of WHA, as well as complementarities between MHA and WHA as such, are rather ubiquitous phenomena of modern corporate firms and cannot constitute decisive factors for distinguishing one mode of CG-OA linkage from possible others. Firm-specificity of WHA or complementarities between MHA and WHA can make the internal relationships between WHA and MHA relational and their joint outcomes subject to individual or collective bargaining within the firm between the holders of these assets. But we argue that these aspects of human assets alone do not necessarily have distinct impacts on corporate governance. As we will see below, CG-OA linkages that are broadly similar to Anglo-American, German and Japanese models may well all involve firm-specificity of both human assets, as well as complementarities between them.

Instead, as classificatory tools, we adopt the following two related notions. First, we use the Edgeworth notion of complementarity between MHA/WHA on one hand and NHA on the other. Second, we use the notion of “essentiality” as first introduced Hart (1995, p.45) to understand the role of MHA/WHA within a particular OA: we say either of the HAs is essential if the ownership of NHA by the holder of that HA cannot complement that HA in the absence of a relational association with the other HA. Put another way, increasing the residual rights of control over NHA by one HA will not increase its marginal product without other HA’s cooperation. In this case, that particular HA is indispensable to OA. Within a particular OA, one or both of HAs can be essential, or neither of them may be essential. Depending on which combination holds, we can distinguish different types of CG-OA linkage. It is important to note at the outset that these relationships among the assets are *not* solely technologically pre-determined. We posit that the uses of MHA, WHA, and NHA are controlled strategically by the respective stakeholders (owners). Thus a mode of strategic interactions and their stable outcome, on one hand, and a mode of relationships among various assets, on the other, are codetermined and reinforce each other under possible impacts of institutional parameters (such as political, social, and market-related) outside the corporate domain.

#### ***A. Unilateral Essentiality: Property- Rights-Based Control of Hierarchical OA***

Let us start out with the classical case of essentially following the property rights approach formulated by Hart (1995) and his associates. Let us assume that

- MHA is *essential* in that the marginal product of WHA cannot be enhanced without the input of MHA, even if the ownership of NHA (i.e., the residual rights of control to decide on the use of NHA in contractually unspecified situations [Hart, 1985]) is endowed to the workers.
- Asymmetrically WHA is *not essential* in that the ownership of NHA are *complementary* to MHA even without the cooperation of firm-specific WHA so that the marginal value of MHA can be increased with the ownership of NHA.

Note that these two conditions of unilateral essentiality do not preclude the complementarities stemming from cooperation between MHA and firm-specific WHA. They are specified under the critical conditions of non-cooperation which defines the bargaining positions of the two stakeholders, MHA and WHA, in sharing firm-specific surplus. The first condition of MHA's essentiality may be interpreted as capturing the essence of hierarchical ordering of organizational activities in which WHA is accumulated and/or used within the context and limits specified by the manager. The second condition is prominent in the property rights approach of Hart. If these two conditions hold, they would imply that the integration of management and ownership of NHA is the second best solution.<sup>2</sup> It enables the manager to improve on its bargaining position over the distribution of firm-specific surplus vis-à-vis the workers by means of investment in MHA and thus motivates him/her to invest more in MHA, resulting in higher over-all efficiency.

If the manager is constrained by their own financial resources for the ownership of NHA, (s)he needs to rely on the supply of financial resources by outside investors. Then (s)he is subjected to market-controlled agency-contracting through which the residual rights of control over NHA is conditionally delegated to her/him. In this setting market-financing and hierarchical control of OA may be said to complement each other through the relative specialization of 'ownership', such as risk bearing functions, and 'control' (in the sense of Chandler 1977) based on specialized managerial expertise. This is the type of CG-OA linkage most familiar to economists and remindful of the essential feature of the so-called Anglo-American model, so that much does not need to be said about this here. But a question highly relevant to us is whether this is only possible solution. If not, what situation warrants other solutions to become strategically viable?

### ***B. Bilaterally Limited Essentiality: Institutional Complementarities between CG-OA Linkage and the State***

As in the first case, let us start with a simple situation in which the manager is not constrained by financial resources to own NHA. Suppose that

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<sup>2</sup> In the world of asymmetric information the first best solution cannot be implemented. If there were a unique implementable first-best solution, then comparative institutional analysis would lose meaningful subject of study.

- WHA and the (partial) residual rights of control over NHA are complementary in that workers' marginal satisfaction from investment in WHA can be enhanced if combined with the (partial) ownership of NHA even without relational association with MHA.
- MHA and the (partial) residual rights of control over NHA are complementary in a similar manner as above.

The first condition anticipates a situation, as in artisanship or craft production among others, where workers can increase their marginal satisfaction from investment in WHA if they can also control work-site set-ups, use of equipment in response to unusual events, etc.<sup>3</sup> If the residual rights of control is complementary *both* to MHA and WHA, then according to the definition by Hart, *neither* MHA nor WHA are (unilaterally) essential. However, we may refer to this case somewhat loosely as that MHA and WHA are jointly essential to OA to the extent that their respective control over NHA is bilaterally limited or incomplete.

In principle, the manager may prefer not to give either wage premium nor partial residual rights of control to the workers, but may need to grant workers one or the other in order to motivate the accumulation of WHA by the workers. Under this scenario, two institutional arrangements may be possible (as sub-game perfect equilibria in the framework of repeated games between the manager and the worker), depending on the value of external institutional parameters that constrain the mechanism of wage determination (Aoki 2001, pp.287-91). If the standard wage-rate is set external to the firm, such as through an industrial agreement between an industrial association and industrial union, and the state “enables” the industrial agreement to be generally enforceable (as in the case of German corporatism), then cooperation between the holder of MHA and that of WHA may be sustainable on the basis of sharing residual-rights-of-control (in the form of workers' participation in formal governance structure, the works councils, workers' stockownership plans, etc). If the state is “liberal” in that it does not intervene in private wage-contracting and wage determination remains decentralized, the classical Hartian solution may emerge on the basis of workers' sharing in firm-specific surplus in the form of wage premium while the residual rights of control exclusively accrues to the manager. Likewise, liberal states are less likely to anchor rights of worker participation in law, which would act as “non-contractual conditions of contracts” in Durkheim's sense (1984, p.158). In other words, an enforceable legal framework for worker participation may be necessary to focus managers and workers on the potential positive-sum gains of cooperation, by constraining the potential for short-term gains from non-cooperation that exist under purely voluntary arrangements (Streeck 1995).

If the manager is constrained financially in the case of sharing control rights, outside investors need to be invited to provide financial resources and participate in CG structure such as in the form of

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<sup>3</sup> Unlike the case of unilateral worker control, the second condition suggests that ‘craft’ production on the shop floor may benefit from integration into a wider OA where MHA plays a significant role.

codetermination a la Germany. It can be shown that outside investors prefer long-term lending to equity participation in this case, because in this way their preference in corporate control becomes congruent with those of the workers in restraining excessive risk-taking of the manager (Aoki 2001). In that sense, corporatism, co-determination and the *Hausbank* system in the traditional German model may be considered as constituting an institutionally complementary cluster, while another cluster may include stock market control, hierarchically ordered HA, and the liberal state.

### ***C. Symmetric Essentiality: Relational Contingent Governance***

In the classical hierarchy, the essentiality of HA is exclusively and unilaterally attributed to the owner of MHA. Let us adopt now the following alternative hypotheses:

- The respective contributions of MHA and WHA in cooperation are *inseparable* in the sense that their marginal products are not individually distinguishable or observable.
- Both MHA and WHA are *symmetrically essential* to each other in that the marginal product of each without relational association with the other cannot be enhanced only with the endowment of ownership of NHA.

The first condition corresponds to the concept of “team” property of OA originally conceptualized by Alchian and Demsetz (1950) and elaborated later by Holmstrom (1979).<sup>4</sup> Such a property may be thought to hold if the design of OA involves information-sharing across the management and the workers, as well as among the workers, as an indispensable feature for its efficient operation. Even if the external supply of NHA is necessary for the operation of this type of OA, NHA and an individual HA in isolation cannot be in complementary relationships. Then, it can be shown that the following type of CG is the second-best (Aoki 2001, pp.291-305).

A relational monitor-cum-investor (alternatively a delegated monitor for the investors) sustains the on-going relationships with the team composed of the holders of MHA and WHA. As far as she observes that the collective performance of the team exceeds a certain critical threshold point, she delegates the residual rights of control over NHA to the team and receives a constant contractual rate of returns to investment. Meanwhile, any surplus can be distributed among the holders of MHA and WHA according to organizational rules or conventions (such as seniority rules). When the collective performance falls below the critical point, she decides whether to bail out the team if preserving the continuation value of the team is judged to be worthwhile, or else withdraw the investment and punish the badly-performing team by its decomposition. Since the control rights shift between the team of HA holders and the relational monitor contingent on the value state of the firm, this model may be called the relational contingent governance model.

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<sup>4</sup> More precisely, their conditions are more generic in that the distinction between the manager and the workers are not made explicitly.

The effectiveness of this type of CG for inducing efficient cooperation of the HA holders is enhanced under a number of further conditions. First, HA holders may become more cooperative when the individual value of outside opportunities for each of them is lower. This would be the case when other organizations are likewise organized as teams of long-term associations so that the reemployment of individual HA holders disbanded from a failed team becomes harder with the substantial loss of essentiality. Thus the convention of long-term employment in the organization domain is considered as an institutional complement to the linkage between the relational contingent governance and the team-like OA. Second, speaking more concretely the role of relational monitor may be considered as approximated by the so-called main bank whose associations with client firms is relational.<sup>5</sup> Then the institutionalization of the main bank system also constitutes an element of a complementary cluster surrounding this linkage. Conversely, where the demand for external capital declines or banks become less effective in monitoring, the incentives of HA holders may be lessened due to lack of external discipline and their moral hazard behavior may become less controllable. (see Ch.2 in Aoki et al. 2007).

#### ***D. Encapsulated Essentiality: Venture Capital Governance***

Some aspects of relationships between venture capitalists (VC) and entrepreneurial start-up firms (ESFs) are known to be somewhat akin to the relational contingent governance (Aoki 2001, Chapter 14; Kaplan and Stromberg 2003). VC initially provides only a limited amount of seed money for founding ESF and afterwards it decides whether to provide further funding to the latter, restructure their management and salvage potential values of their HA, or liquidate it, depending on the progress of its development efforts. In successful cases, the relationships will be terminated by Initial Public Offering (IPO) of the ESF or its acquisition by an established firm within a niche market. As it is normally the case that the VC initially provides seed money to multiple ESFs proposing similar development projects and become increasingly selective in later-stage financing, the process may be thought of as a tournament game played among ESFs with the VC as a referee.

Within each ESF a high degree of (symmetric) essentiality of HAs is incorporated. This may appear also somewhat similar to the previous case, but two differences are central. One is that the essentiality of HAs in ESFs is not so much due to the inseparability of the HAs within the team, but to the decisive importance of HAs relative to NHA. Note that our notion of essentiality is based on complementary relationship between NHA and HA in the absence of relational associations of HAs. In the current case, however, even if holders of HA are separated from particular ESFs, whether or not they will have access to the ownership of NHA may not be so material for their productivities (otherwise, the classical proprietor firms of Hartian type will result). Second, a high degree of HA-

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<sup>5</sup> Conversely, the organizational convention of the team-like OA enhances the incentive of the main bank to bear the role of relational monitor, because firms of that type are willing to pay insurance premium for possible bailing-out by the main bank in the event of mild financial distress. See Aoki (1984)

essentiality is encapsulated within individual ESFs in the context of a cluster of ESFs, but not spread out within a single Chandlerian type of firm that integrates a host of activities. Each ESF is specialized, and compete with others, in the development of a particular module of a potentially large innovative product system. The design of such a product system is not decomposed into modular designs by ex ante centralized planning (as in the case of the development of IBM System/360), but it evolves through ex post combinations of successful modular designs. In order for such mechanism to be workable, it is necessary that only simplified interface rules among modular products are publicly made open ex ante or interim through communications mediated by VCs and other means. It implies that technological and attribute complementarities among modular products are to be minimized so that their design efforts can be made separable (technically this requirement can be better facilitated in the digital-based industry where design and its manufacturing implementation can be separated). Thus, when comparing their activities to traditionally integrated Chandlerian firms, it is more appropriate to compare ESFs and VCs as a cluster, but not each ESF individually. If we look at VC-ESFs as a relational system, the basic nature of its OA may be summarized by the following dual characteristics:

- A high degree of HA essentiality is *encapsulated* within each ESF in a context of clustered VC-ESFs.

Toward such OA, the VC governs tournament-like competitions among ESFs through the above-mentioned stage financing. Under the condition of a high degree of uncertainty involved in the development of modular designs and their system integration, this linkage is known to have two distinct characteristics: (1) it can generate option values by running parallel development efforts (experiments) by multiple ESFs (Baldwin and Clark 2001), and (2) it can generate externalities by attributing higher marginal probability of winning the tournament to the incremental accumulation of HAs that are encapsulated within each ESF (Aoki and Takizawa 2002).

Table 1 summarizes the four modes of OA that we identified above based on a simple classification of the essentiality of HAs involved and the linkage of each to its corresponding CG. OA is classified in terms of essentiality in the relationship between MHA and WHA. It is important to note that those modes of OA are *not* to be considered as purely technologically determined prior to CG. Rather, it would be reasonable to posit that they co-evolve and institutionalized with the corresponding CG. If such is the case, then history matters in the institutionalized selection of one particular mode against possible others and any one of the mode may not be absolutely superior to the other independently of the nature of markets, technology, social values and others. Their performance characteristics may be relative (see Aoki 2001, ch. 5 for this), although we do not fully explore

comparative advantage/disadvantage of these modes in this paper.<sup>6</sup> In the next section, we will explore whether or not one additional mode of OA linkage can be hypothesized (see Table 1) and used to interpret the path dependent evolution of Japanese corporate governance.

--TABLE 1 HERE--

### **3. Path-dependent Institutional Change: the Case of Japan in 2000's**

In the previous section, we argued that one of the CG-OA linkages we identified, relational contingent governance, may be thought of capturing some essential elements of the traditional Japanese system characterized by institutional complementarities among the life-time employment system, the team-like OA (the so-called J-firm), and the main bank system. However, as we have empirically documented and analyzed elsewhere in detail (Aoki et al, 2007), the Japanese system has been exhibiting both substantial change and continuity in various respects over the last decade. First, the role and scope of the main bank as an institution has changed with some firms reducing their dependence on bank loans in favour of bonds (ibid, Chapter 2). Ownership patterns have also changed with reduced levels of cross-shareholding (ibid, Chapter 3) coexisting with a substantial increase in ownership by foreign institutional investors (ibid, Chapter 4). Second, since the late 1990s, firms have responded to these changes by making substantial efforts to increase transparency and adapt the structure of their corporate boards (ibid, Chapter 12). These changes also occur in the context of a new legal-setting that now permits the use of stock options and has outlined a legal basis for US-style boards based on committees with independent non-executive directors as an option (ibid, Chapter 11). Last, the norm of lifetime employment has remained remarkably robust in many firms, but the number of full-time regular employees has gradually decreased and labour has become more mobile in certain industries (ibid, Chapter 10). Some firms have nonetheless adapted these systems away from purely seniority pay and introduced greater elements of merit-based remuneration (ibid., Chapter 9). An interesting element of these changes is that they do not affect all firms in Japan equally and hence the characteristics of Japanese firms are certainly becoming more heterogeneous over time (see also Sako 2005).

It is interesting to examine what these changes imply: do they indicate a gradual system convergence to another existing linkage such as the Anglo-American norm, the evolution to a new or

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<sup>6</sup> One further avenue of exploration of our approach may be thinking how it relates to the business strategy literature on competitive advantage. This perspective would suggest that different linkages between CG and OA will produce different sets of competitive advantage. The US model may have advantages related to Porter's industry view of comparative advantage essentially based on managerial expertise yielding advantages in understanding market opportunities. Meanwhile the traditional Japanese model may be seen as relating to the resource based theory of the firm wherein competitive advantage is grounded in on long-term organizational capacities of workers, etc. in the sense of Penrose (1959), Nelson and Winter (1982) and others. Finally, the VC model may also relate to an understanding of competitive advantage emerging in economic sociology, where competitive advantage is based on venture capitalist's position within social networks that allows for access and 'brokering' of innovative combinations of MHA and WHA (Burt 2005) and ability to overcome situations of high uncertainty (Podolny 2001).

hybrid linkage, or a superficial modification of the distinctive traditional system. In this section, we first present a systemic picture of the changes based on cluster analysis to identify key patterns of linkages across firm characteristics, and then offer a novel interpretation of the nature of these changes by expanding the essentiality-based framework and typologies we developed in the previous section.

### ***A. Cluster Analysis of Emergent Diversity***

In this section, we present an inductively based typology of the diverse CG-OA patterns among Japanese firms. The analysis draws upon Jackson and Miyajima (2007) and uses survey data collected by the Policy Research Institute of the Ministry of Finance in December 2002, and is supplemented with financial data from the Nikkei database. The survey was sent to all listed non-financial firms and received a response rate of 34.0%.<sup>7</sup> Using the resulting data, we include 14 data items in our analysis as follows:

- Finance and ownership characteristics:
  - Ratio of bond finance to assets;
  - Ratio of bank loans to assets;
  - Percentage of ownership by financial institutions, non-financial corporations, foreign investors and individuals.
- An index of other corporate governance characteristics based on:
  - the degree of minority shareholder protection (e.g. general meetings of shareholders);
  - the degree of separation between management and monitoring in corporate boards;
  - the degree of public information disclosure.
- Characteristics of the organizational architecture and employment contracts:
  - The degree of decentralization of decision-making within the organization;
  - The presence or absence of an enterprise union;
  - Employment and incentive characteristics such as the presence or absence of lifetime employment norms, merit-based pay systems, and stock options.

In order to develop a typology of CG-OA linkages, a cluster analysis was used to group firms into distinct clusters that maximize the statistical differences between each group, while minimizing the variation within each group. A two-step cluster routine was used in SPSS whereby the number of clusters was determined by the cubic clustering criterion, which measures within-cluster homogeneity

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<sup>7</sup> This data was collected by Hideaki Miyajima as part of the research team at the Policy Research Institute, Ministry of Finance. A detailed description of the survey and data items is provided in Jackson and Miyajima (2007) and Miyajima (2007).

relative to between-cluster heterogeneity and suggests an ‘optimum’ number of clusters (Kretchen Jr. and Shook 1996).<sup>8</sup> The cluster algorithm identified three broad clusters (clusters 1, 2, 3), which we then subdivided into two sub-clusters each (sub-clusters a and b) in order to capture any further heterogeneity within the initial groups. The analysis highlights only those variables that have statistically significant different means across groups at a 95% confidence level. The cluster analysis thus highlights the most common configurations of variables within the sample of Japanese firms.

If we apply the reasoning developed in the previous section, we may expect that these aspects co-vary between the corporate governance characteristics such as finance, ownership and the corporate governance index, on one hand, and the characteristics of organizational architectures and employment, on the other hand. That is, market-oriented finance and governance characteristics will go together with more market-oriented employment and incentive characteristics, and vice-versa. However, the results of cluster analysis indicate new combinations. As we shall demonstrate, finance has become more market-oriented, but this characteristic coexists in a new combination with continued use of long-term employment patterns as the core of the OA. In fact, this ‘hybrid’ pattern has emerged as a dominant form of CG-OA linkage in Japan.

#### **--TABLE 2 HERE--**

Table 2 shows the average values for each of the six groups identified in the cluster analysis. The results suggest that Japanese firms fall into three broad groups: traditional Japanese (J-type) firms with strong relational elements on all dimensions, and two types of ‘hybrid’ firms that combine either market-oriented finance with relational OA (type 1), or relational finance or insider boards with more market-oriented employment and incentive patterns (type 2). The J-firm and type I hybrid groups can be further divided into sub-clusters in order to highlight potential variation within each broad ‘type’. Next, we describe these groups in some detail.

*J-Firm Clusters.* The first broad cluster composed of three columns (1a, 1b and 3a) may be interpreted as traditional J-type firms with or without a slight reform in their respective internal characteristics. In terms of finance and ownership, these firms use predominately bank finance rather than bonds and have high levels of inter-firm shareholding, but low levels of ownership by foreigners or financial institutions. In terms of boards and management, firms belonging to the subgroup (1a) have not undertaken reforms of their CG practices by 2002. These firms have low scores across all aspects of the corporate governance index (CGI), reflecting low shareholder influence, few outsiders on the board, and low levels of transparency. In terms of employment and incentives, these firms maintain lifetime employment norms and have not replaced seniority-based pay systems with merit

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<sup>8</sup> This procedure is also appropriate when using dichotomous or categorical data alongside other continuous measures, and is robust even when the variables are not statistically independent. Continuous variables were standardized in order to eliminate biases from variables with large ranges (e.g. where elements are separated by greater distances), and the consistency of solutions was assessed by performing the analysis on a split sample.

based pay. Only a small percentage adopted stock options as a form of managerial incentive and most of the firms have enterprise unions. These characteristics are basically consistent with the traditional J-type firm as characterized by the linkage between relational contingent governance and the team-like OA. This group contains a large number of firms from the construction, chemicals, apparel and textiles, and small firms in machinery and automotive sectors.

The external elements of firms in the subgroup (1b) are rather similar to those in the subgroup (1a), but these firms are more ‘independent’ of traditional company groups, reflected in lower ratios of bank lending and inter-firm shareholding. The firms also have more ‘paternalistic’ labour relations in that lifetime employment is maintained despite lower levels of unionization. This sectoral pattern of these firms reflects less unionized sectors such as trading companies and lower-skilled service firms, and also includes some family-controlled firms in electrical machinery or foods. Finally, we note that subgroup (3a) is also very close to classic J-firms due to high inter-firm ownership and persistent lifetime employment, despite being marginally ‘modified’ through the stronger use of merit-based pay among retail establishments or automotive firms from the Toyota group.<sup>9</sup>

*Hybrid Clusters of Type I: External Monitoring of Relational Architecture.* The second broad cluster of firms (columns 2a and 2b) display a ‘hybrid’ pattern that mixes market-oriented finance and ownership characteristics, but relational OA characteristics. We call these clusters as Type-I Hybrids. These firms make strong use of corporate bonds, and display high levels of ownership by foreign investors. Meanwhile, the levels of bank loans and inter-firm ownership are lower than the J-firm clusters. Notably, despite their strong capital market orientation, employment patterns remain relational based on lifetime employment norms and very high levels of unionization. These relational employment patterns are sometimes modified by moving from purely seniority-based wages by introducing additional elements of pay schemes based on notions of ‘merit’. Meanwhile, boards and management have made major changes in terms of greater corporate disclosure and transparency for investors, but have made lesser changes in terms of shareholder rights or have brought only limited numbers of outsiders onto boards. This group includes a substantial proportion of the largest internationally oriented firms. Electronics and communications are well represented, but wide ranging in terms of sectoral characteristics.

The Type-1 ‘hybrid’ cluster is also internally heterogeneous and suggests some distinct patterns of change. The first sub-group (2a) is distinguished by very high levels of transparency and foreign ownership, as well as the stronger use of merit-based pay systems. These firms have not abandoned seniority entirely, but adjusted wages to reflect greater differentials within particular age cohorts based on individual performance evaluation or measures of group and firm performance (Aoki

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<sup>9</sup> Although this group is statistically similar to sub-group 3b in having some market-oriented pay elements, we view it as having more substantive commonality with the J-firm pattern due to the essential retention of lifetime employment.

et al. 2007, especially chapters 9 and 10). This sub-group includes prominent Japanese blue-chips such as Toyota, Canon, or Kao. The second sub-group (2b) has been more cautious in promoting transparency, where these changes reflect lower levels of foreign ownership but higher use of corporate bonds. In parallel to these new elements, this sub-group also retains a greater number of traditional J-firm characteristics, such as a modest use of bank borrowing and predominance of seniority-based pay. Well-known examples include Hitachi, NTT DoCoMo, some major utilities firms, and several Mitsubishi group firms. On the whole, these two hybrid groups also have strong economic performance, in terms of return on assets, than the J-firm groups, which suggests the potential effectiveness of hybrid forms of this type.

*Hybrid Cluster of Type II: Relational Monitoring of Competitive Architecture.* The cluster represented in the column (3a) exhibits patterns asymmetric or inverse to Type-I, which we call Type-II. It is the external elements of corporate governance that are relatively more similar to the J-firm clusters, such as bank finance and inter-firm ownership. The corporate governance index scores are average, which places this cluster higher than the J-firm groups but much lower than the Type-I hybrids. However, these firms have distinctly more market-oriented or ‘adversarial’ employment patterns with low levels of lifetime employment and unionization, as well as frequent use of stock options. This group includes IT or other high-tech service firms, some retail establishments, general trading companies or family-owned companies. In these sectors, competitive advantage may be less dependent on WHAs or utilizes a mobile external occupational labour market, such as in IT services.

In sum, this analysis suggests the increasing *heterogeneity of CG-OA linkage* between those firms maintaining J-firm characteristics and those changing toward hybrid patterns over the last decade. In terms of mere numbers, the J-firm clusters still account for 55% of firms compared to Type-I hybrids that constitute roughly just one-fourth of Japanese listed firms. However, Type-I hybrid groups are actually becoming the dominant pattern when considering that this group include many of the largest Japanese firms and thus account for 67% of total employment. Only 10% of firms fall into the Type-II hybrid group with strongly market-oriented employment patterns. But as we will see, the presence of this group may not be ignored for the emergent diversity.

Finally, it is quite notable that no major cluster of firms has yet emerged in Japan having highly market-oriented finance and a hierarchical OA, as outlined with regard to the Anglo-American model. While this possibility cannot necessarily be excluded in the future, the existing empirical evidence clearly does not suggest a strong pattern of convergence on this form of organization. In particular, lifetime employment may be relatively robust to changes in some other aspects of corporate governance. Of course, market oriented finance and relationship oriented employment have been argued to be incompatible theoretically (see Aoki et al. 2007, Chapter 9), However, despite the changes in finance and ownership, employment stability in Japan has remained very high through

2005 compared to other countries such as the U.S., UK or Germany (see Aoki et al. 2007, Chapter 10). More specifically, the level of foreign ownership has no impact on the commitment to lifetime employment norms per se, although stock options have a negative impact and insider boards have a positive impact. This suggests that in Japan the internal aspects of OA are more closely linked than OA and external and financial aspects of CG.

Given the relative the diversity of links between CG and OA, an interesting question emerges as to what factors may influence whether a particular firms falls into a J-type, Type I hybrid or Type-II hybrid pattern. In particular, the Type I hybrid firms are much larger than the other groups, reflecting the importance of firm size in determining finance and ownership characteristics, in particular. Size is an important proxy for the degree of financial dependence on banks for external finance (see Aoki et al. 2007, Chapter 2), as well as whether firms are attractive to foreign institutional investors who seek a high degree of market liquidity and thus often limit their investment to the top 100 or so Japanese firms (ibid, Chapter 3). Meanwhile, employment characteristics appear closely related to a number of different factors, including industrial sector and age, as well as other path dependent factors such as the degree of unionization and prior establishment of labour-management consultation. We noted that more market-oriented employment in the Type II hybrid cluster was correlated with younger firm age and particular sectors, such as high technology firms or low skill retail outlets, where firm-specific skills may be less relevant.

In terms of economic performance, Type-I hybrid group achieved significantly higher economic performance in terms of return on assets than tradition J-type firms. This poses an interesting question regarding the potential effectiveness of the hybrid linkage. Meanwhile, classic J-firms continue to struggle with stagnant or negative economic performance, which may reflect the weak CG role of main banks at the survey date, as they were struggling to emerge from the banking crisis. The Type-II hybrid also achieved above-average performance, but also a very high standard deviation of ROA, suggesting its potential viability.

### ***B. Is a “Hybrid” Institution Viable? External Monitoring of Essential Internal Linkage***

The results of cluster analysis presented above immediately suggest a host of interesting questions: How can we interpret the emergent diversity of CG-OA linkage in the Japanese economy? Why do Type-I hybrid firms perform better? How does CG actually work in the Type-I hybrid clusters? Why do some firms opt for the Type-II hybrid forms? Are these forms viable in the long-run?

In the previous section, we suggested that market-oriented financing-cum-control is complementary to the hierarchical OA, while the life-time employment system is complementary to the main bank system. But the cluster analysis in the previous section appears to challenge such a

prediction. The Type-I hybrids combine market-oriented financing with the quasi-traditional employment system, while Type-II hybrids combine the traditional relational financing with more market-oriented relationships between MHA and WHA, suggesting a hierarchical-oriented nature of OA. Theory of complementarities suggest, however, that while complementary relationships among two or more variables make their multiple value-combinations possible equilibria, a mixture of those equilibria is not likely to constitute a stable equilibrium, but be merely transitory. However, unexpected mixtures may suggest a weaker form of economic ‘compatibility’ that survives for other (non-economic) reasons (Crouch et al. 2005).<sup>10</sup> Thus, if an apparent hybrid form performs better and is considered to be viable, it may involve some tacit element that is not a simple combination of known equilibrium values of variables.

Recall that a crucial factor distinguishing the property rights-based control of hierarchal OA from the relational contingent governance of the team-like OA was unilateral or asymmetric nature vs. symmetric nature of essentiality among HAs involved. One possible hypothesis that we propose is that the emergence of the seemingly new Type-I hybrid pattern may involve a new type of essentiality relationship between MHA and WHA, which may be susceptible to external market monitoring different from the unilateral essential model. In the traditional J-firm, the roles of the management and the workers, and thus the nature of their respective HA, are not always strictly distinct and well-articulated. It was a well-understood social norm among the Japanese firms that top management is recruited from the ranks of permanent employees and considered as the pinnacle of their career advancement. This practice facilitated the sharing of information, as well as responsibilities for decision-making and their outcomes, and vice versa, resulting in the team-like OA. However, in the wake of intensified global competition, the development of IT technology and more diverse social values in Japan, the managements of the Japanese firms seem to face a set of challenges to be more autonomous and innovative in the use of their own MHA, while continuing to rely on the essential contributions of associated WHA in a path dependent manner.

Thus, we propose a new type of OA as a theoretical construct in which MHA and WHA are internally linked, and mutually indispensable in their respective roles. Suppose that MHA is to be mobilized for the design of a distinctive business model composed of such things as organizational architectural design, marketing strategy, organization-specific reward system, relations with the labor union, the design of work environments, corporate values to be shared with the workers, etc. Meanwhile, the workers implement such a business model or assimilate themselves with corporate values implied by it. We assume that:

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<sup>10</sup> One approach to this case is to explicitly introduce “social-exchange” as an additional domain of game and analyze sociological concepts such as “social embeddedness” in terms of equilibrium linkage between that domain and economic domains (Aoki 2001, ch. 8).

- The residual rights of control over NHA alone cannot increase the marginal satisfaction (pecuniary and otherwise) from their WHA without associating themselves with a matching construct of MHA (e.g. a business model), while the marginal effectiveness of the manager's effort cannot be increased by the residual rights of control over NHA alone without attracting and maintaining the workers willing to develop WHA specific to it. Thus MHA and WHA are *reciprocally essential*.

This condition of reciprocal essentiality may appear to be closely related to the usual condition of complementarities between MHA and WHA, but is actually more specific in that productive contributions of the residual rights of control over to MHA/WHA in isolation are denied. From the purely theoretical point of view, reciprocal essentiality of HAs implies that “the ownership structure does not matter since neither party's (human asset) investment will not pay off in the absence of agreement with the other” (Hart, 1995: p.48). However, if a large proportion of financial resources are supplied externally and equity ownership are traded in market, the market may still be relevant to the internal linkage of reciprocally essential MHA and WHA, although in a different way than in the case of the unilaterally essential MHA. Its role may become more manifest in its function of evaluating the linkage of MHA and WHA than controlling MHA alone.

If the management lets it to be known as a part of its business model that a proportion of the economic value created by the essential internal linkage will be accruable to the stockholders according to a certain rule and if the stock market is informative, the fundamental stock value may be constructed as a summary statistic correlated to the future values of the linkage. If the board of directors is entrusted to effectively replace or appoint top management contingent on the (expected) long-term stock value, the management can be disciplined to create and sustain a valuable internal linkage, while the workers are motivated to invest in their own WHA. On the other hand, the stockholders themselves may be motivated to do a better job of monitoring if they can benefit from making good evaluative judgments in selecting their own portfolios. Therefore, under certain circumstances complementarities may arise between the creation and sustenance of the essential internal linkage, on one hand, and the stock market evaluation of it, on the other. In this model, the board of directors ought to act not as the agent of the returns-maximizing stockholders but as the “trustees” for the stakeholders including the workers (Blair and Stout 1999). The board would not force the management to increase the stock value at the sacrifice of the workers, because it would be likely to destroy the valuable internal linkage.<sup>11</sup> Meanwhile, investors retain an evaluative role and only take on control functions contingent upon enduring negative market evaluations, where complementarities between reciprocally essential business model (MWAs) and WHAs break down.

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<sup>11</sup> This model is reminiscent of the ‘enlightened shareholder value model’ that stresses the common long-term interests of investors and employees under certain conditions (see Parkinson 2003).

It must be cautioned that the viability of this model depends on a number of conjectures about how capital markets operate, whereas empirically market processes are also medium of power shaped by various diverse players (e.g. relatively patient institutional investors, private equity, hedge funds, or other firms doing M&A). For example, while institutional investors such as pension funds may take a relatively long-term view toward future values on internal linkages, other investors may not. This model will become more viable if the government and/or privately-ordered organizations such as Security Exchanges help support and enforce the infrastructure of services for stock markets to process corporate information more accurately, including not only accurate financial valuations but broad disclosure of forward-looking business reviews and narrative forms of reporting. In particular, institutionalized rules regarding the market for corporate control may affect the conditions under which firms are sold to the highest bidder and thus whether investors may support preserving existing HA. While these issues are empirical ones and often politically controversial, the important theoretical point is that the potential for market inefficiency and mis-valuation of HA may undermine the linkage of reciprocally essential MHA and WHA within this model.

It may be yet premature to conclude that the core part of the emergent Japanese system, the Type-I hybrid cluster, tends to approximate the described model of external monitoring of internal linkage of reciprocally essential HAs (EMIL). However, this may be a worthwhile hypothesis to examine in the light of several observations. Firstly, this cluster includes firms that are most competitive in the global market competition, while the traditional J-firm type is not adapting well to the new market environment. Thus, the change from the traditional type to the Type-I hybrid may be quite substantial, rather than a superficial or cosmetic response to stock market pressures. Secondly, the growing access to globally integrated financial markets by Japanese firms with better business models may have weakened the disciplinary role of relational contingent governance on one hand and lessened its constraining effect on institutional change, on the other. Thirdly, the reciprocal essentiality between MHA and WHA may indicate a possible path-dependent evolution from the symmetric essentiality of the traditional Japanese system. The role of MHA has become more autonomous and unique, but WHA also remains to be essential in implementing the business model constructed by MHA. This observation also suggests that the emergent hybrid form of CG may not converge to the Anglo-American model of property-rights-based control of internal hierarchy in that WHA remain as essential and not substitutable by NHA without their cooperation. Fourth, unlike relational contingent governance, no relational monitor exists making a clear commitment to bail-out moderately depressed Type-I hybrid firms. Such bailing-out commitment was necessary in the relational contingent governance for avoiding premature dissolution of collective HA when life-time associations of WHA are conventional. However, the co-emergence of Type-II hybrids facilitates labor-mobility in economy-wide albeit to a limited degree and thus eases possible burdens of the

unemployment, making the bailing-out commitment less important. This situation suggests interesting complementary relationships between the co-emergence of Type-I and Type II hybrids.

Thus there seems to be several reasons to hypothesize that the Japanese system may be evolving with the Type-I hybrid clusters as its core. However, this does not mean that the direction of CG reform in Japan is clearly set and pursued. To evaluate the value of the internal linkage between a business model and essential WHA, product market evaluations (thus current profits) are fundamental. However, the product market can evaluate only the present outcome of the internal linkage, not possible outcomes in the future. Also, a valuable internal linkage takes time to build. In this regard, the emerging Type I-hybrid may depend on the path dependent accumulation of HAs, prior to the transition to new market-oriented forms of CG. As discussed above, the stock market may now be potentially in a better position to predict future outcomes by aggregating dispersed information, expectations and values prevailing in the economy if they can filter noises to a reasonably degree.<sup>12</sup> Even if the stock market is hypothetically assumed to be informative, a corporate governance structure may not be complete with just that, however. One more critical question still remains to be resolved: How can a stock market evaluation of an individual firm be used effectively in the selection and replacement of management at the firm level? Who will exercise the disciplinary function in critical states of corporate-value?

No single solution seems to have been established yet. But this may be expected because the reciprocal essentiality of HAs implies that ownership structure is theoretically “irrelevant” in the Hartian sense. Thus for small and medium-sized firms, as well as large firms with bank loans in the J-firm clusters, banks may continue to perform major monitoring and disciplinary functions in some cases. But for large firms with rather limited or even zero bank loans, the ability of the banks to correct poor management before a real crisis is definitely limited. A first possible alternative to the bank’s disciplinary role would be to transform the board of directors from the traditional status of a management substructure into a quasi-independent body that could discipline top executive management in a critical corporate state. Some firms may be heading a step in that direction by adopting a board structure with independent subcommittees or increasing the number of independent directors after an overhaul of the corporate law introduced in early 2000s. How it will work has yet to be seen, but an experiment is certainly worthwhile.

Secondly, as WHA are essential in the implementation of business model constructed by MHA, the voice of their holders can also be of relevant as important inputs into the CG process

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<sup>12</sup> In fact, market prices cannot be completely perfect. If all information available in the economy can be immediately and completely reflected in market prices, then nobody would be motivated to collect information. (Grossman and Stiglitz, 1980).

through their own organizations (unions) and/or their implicit influence on the board.<sup>13</sup> Third, for start-up firms which are not yet mature enough for stock market evaluation, venture capital firms that act as sort of market surrogates in a relational manner are gradually gaining visibility. Fourth, in the Japanese stock market itself, investors are becoming more diverse and sophisticated in their monitoring roles. In particular, an active and disciplined market for corporate control is emerging but it remains one that is highly coordinated by the remaining stable shareholders, banks, and some niche private equity funds (often bank-related) in ways that may ‘tame’ market pressures by continuing to discourage open “hostile” takeovers and bust-ups (Jackson and Miyajima 2007b) that would undermine critical CG-OA linkages.

For the time being, a variety of mechanisms may be tried for using stock market signals or their surrogates for the governance of individual firms and subjected to evolutionary selection. The evolution of corporate governance in Japan will remain a dynamic topic over the next decades not only for its own light but also for comparative institutional analysis in general, particularly for understanding the nature of institutional change.

#### **4. Discussion**

In this paper we attempted to understand a possible variety of corporate governance (CG) mechanisms and institutions. In doing so, we departed from the standard principal-agent approach of understanding CG as the ways by which investors control (and/or ought to control) the management of corporations in order to maximize returns to their investment. Instead, we explicitly dealt with internal organizational architecture (OA) of corporations, as well as financial (and in some cases labour) control of them, and explored simple characterizations of possible equilibrium linkages between them.

To explore this issue, we explicitly dealt with two kinds of human assets: managers’ (MHA) and workers’ (WHA), as well as non human assets (NHA), of corporations and relied on two basic concepts of relationships among them: complementarities and essentiality. We have elaborated on the original concept of essentiality proposed by Hart so as to distinguish its five modes: unilateral, bilateral incomplete, symmetric, encapsulated, and reciprocal. On this basis, we were able to subsume a celebrated property-rights-based CG solution by Hart as a special case and show the possibility of multiple solutions corresponding to the diversity of these modes. We suggested that those equilibria could be understood as embryonic models of the traditional Anglo-American *a la Hart* (AA/H),

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<sup>13</sup> Existing empirical evidence in Japan suggests that firms with stronger forms of worker participation may be more likely to adopt market-oriented corporate governance forms, particularly transparency (Aoki et al. 2007, chapter 12). Likewise, in countries with more formalized worker representation such as Germany, the adoption of market-oriented corporate governance mechanisms, such as stock options, has been reflected in more long-term and carefully designed incentive structures than in the UK (Buck and Sharhim 2005).

German (G), traditional and emergent Japanese systems (J and Hybrid-I) and Silicon Valley clustering (SV).

The model based on the notion of reciprocal essentiality of HAs was proposed as a tentative hypothesis regarding the emergent diversity of the Japanese system and to explain competitiveness of its core part as well as the weakness of its inertial part. In some sense, this emerging model may seek to reconcile different sets of competitive advantages. On one hand, external capital markets give greater access to external resources and more market-based flexibility for managers to shape business models based on entry and exit from businesses through M&A and the like. On the other hand, this model seeks to preserve and adapt other advantages based on WHA and the traditional organizational capabilities distinctive of the traditional Japanese model. While these approaches may seem contradictory, in fact, new combinations of advantages based on both markets and relationships are also reconciled for a particular context by the Silicon Valley model, as well as emergent human asset-oriented firms as discussed by Rajan and Zingales (2000). As such, this notion of reciprocal essentiality of HAs may not be quickly dismissed, although further empirical studies over time are needed. Moreover, this model may be not only interesting in its own light, but hopefully stimulate a further thinking of institutional change as a path-dependent process, and possible avenues through which stakeholder-based organizations may respond to global capital markets.

**Table 1 Comparison of Hypothesized Linkages between CG and OA**

| <b>Model</b>    | <b>Corporate Governance</b>              | <b>Mode of Essentiality in Organizational Architecture</b>   | <b>Finance</b>                                |
|-----------------|--|--|---|
| H/AA            | Property Rights-Based                    | Unilateral<br><i>(Only MHA is essential. NHA can complement MHA in isolation)</i>  | Control                                       |
| G               | Codetermination                          | Bilateral, but limited<br><i>(NHA partially complements both WHA and MHA in isolation)</i>   | Partial Control                               |
| J               | Contingent governance by relational bank | Symmetric<br><i>(WHA and MHA are inseparable within integrated team-like OA. NHA cannot complement either of them in isolation)</i>        | Relational, contingent control                |
| SV              | VC-run tournament                        | Encapsulated<br><i>(Both WHA and MHA essential, HAs are encapsulated separately across OAs of individual entrepreneurial firms)</i>        | Step-wise, contingent control                 |
| Hybrid- I/ EMIL | Contingent governance by diverse actors  | Reciprocal<br><i>(Both WHA and MHA makes distinct and essential contribution to OA. NHA cannot complement either of them in isolation)</i> | “Irrelevant”, summary of external assessments |

**Table 2: Japan's Emergent CG-OA Linkages, by Cluster**

|                                 | J-firm |      |       | Hybrid       |      |               | Total       |
|---------------------------------|--------|------|-------|--------------|------|---------------|-------------|
|                                 | 1a     | 1b   | 3a    | Type I<br>2a | 2b   | Type II<br>3b |             |
| Bond ratio                      | 0.01   | 0.02 | 0.01  | 0.06         | 0.10 | 0.03          | <b>0.03</b> |
| Bank loan ratio                 | 0.20   | 0.14 | 0.21  | 0.06         | 0.14 | 0.17          | <b>0.16</b> |
| Shares held by                  |        |      |       |              |      |               |             |
| financial institutions          | 23.1   | 19.9 | 21.5  | 45.6         | 42.5 | 22.1          | <b>27.1</b> |
| other firms                     | 34.6   | 29.5 | 34.1  | 16.2         | 18.5 | 28.0          | <b>28.3</b> |
| foreigners                      | 2.0    | 3.6  | 3.1   | 18.3         | 12.2 | 4.6           | <b>6.0</b>  |
| individuals                     | 39.5   | 46.2 | 40.7  | 19.2         | 25.9 | 44.6          | <b>37.9</b> |
| Corporate governance index      |        |      |       |              |      |               |             |
| shareholders                    | 3.4    | 4.7  | 5.1   | 7.8          | 6.8  | 5.7           | <b>5.2</b>  |
| board                           | 9.4    | 9.6  | 10.5  | 13.9         | 13.6 | 10.6          | <b>10.9</b> |
| transparency                    | 7.1    | 9.2  | 9.3   | 19.7         | 17.1 | 11.0          | <b>11.2</b> |
| Organizational decentralization | 2.4    | 2.3  | 2.4   | 2.6          | 2.7  | 2.2           | <b>2.4</b>  |
| Union                           | 100%   | 19%  | 70%   | 100%         | 99%  | 51%           | <b>73%</b>  |
| Lifetime Employment             | 100%   | 100% | 100%  | 84%          | 100% | 29%           | <b>84%</b>  |
| Merit-based Pay                 | 0%     | 0%   | 100%  | 100%         | 10%  | 100%          | <b>45%</b>  |
| Stock Options                   | 0%     | 46%  | 0%    | 45%          | 35%  | 56%           | <b>28%</b>  |
| Additional Information          |        |      |       |              |      |               |             |
| Employees per firm              | 940    | 718  | 1325  | 7574         | 5493 | 1030          | <b>2067</b> |
| ROA                             | -0.72  | 1.22 | -0.44 | 1.74         | 0.47 | 1.45          | <b>0.45</b> |
| % of sample (firms)             | 26.2   | 15.8 | 13.0  | 9.4          | 14.7 | 21.0          | <b>100%</b> |
| % of sample (employees)         | 11%    | 5%   | 8%    | 31%          | 36%  | 10%           | <b>100%</b> |

The diagram shows the results of a cluster analysis using log-likelihood method to find CG-OA linkages among 723 firms. Source: Jackson and Miyajima (2007a) in Aoki et al (2007). Data source: Ministry of Finance Survey, 2003 and Nikkei.

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