Ownership Structure and Political Rent Seeking:
The Case of Japan

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Abstract

The present paper examines how ownership structure of a firm affects its political rent seeking behavior, focusing on Japanese political economy. In the first part of the paper, I develop a simple moral-hazard model to demonstrate that a firm tends to engage in political activities more aggressively when parts of its shares are held by other firms and/or by financial intermediaries. In the second half of the paper, I test the prediction using the database of about 2300 publicly traded firms annually observed from year 1991 to 2003. Findings are consistent with the theoretical prediction. Both shareholdings by other non-financial firms and those by financial institutions have statistically significant effects, and the sizes of the effects remain stable in all the specifications. During the sample period, the number of ex-bureaucrats in the boards increases by 4 percent when other firms’ shareholdings increase by one percent point. Similarly, one percent point increase in the share of financial institutions increases the number by 2.7 percent. ...but I am still not done with writing.

Keywords: Moral hazard, Collective action problem, Lobbying, Japanese firms, Retired bureaucrats, Amakudari, Political rent seeking

1 Introduction

For several decades, the image of modern corporations provided by Berle and Means (1932) has been a critical presumption in studies of firm behaviors, while rarely been systematically investigated. In a stylized version

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of this view, ownership of capital is widely held by a large number of small shareholders, while control is concentrated to a small number of managers. Most firms stand alone in the sense that they make decisions independently to maximize shareholders’ value. Empirical validity of this view started to be questioned since at least early 80’s by several authors including Demsetz (1983), Shleifer and Vishny (1986), and Morck, Shleifer and Vishny (1988), and a growing body of work has stocked up the evidences against universality of Berle and Means image. For instance, La Porta et al. (1999) investigated the ownership structure of large firms and medium firms in 27 rich economies, and found that outside of Anglo-American economies dispersed corporate ownership is highly exceptional, and many firms are financially interlinked. These findings request to reexamine external validity of existing theoretical and empirical knowledges on firm behaviors which are mostly based on observations on firms in the United States.

As a part of this research program, the present paper examines how ownership structure of a firm affects its political rent seeking behaviors, focusing on the case of Japan, a representative non-Anglo-American economy. In the first part of the paper, I develop a simple moral-hazard model to demonstrate that a firm tends to engage in government-related activities more aggressively when its shares are at least partially held by other firms or by financial intermediaries. Key ingredient of the model is the positive externality generated by the political activities. The model, however, differs from simple internalization of externality story in that the political activities are not enforceable by any shareholders including other firms or financial intermediaries. In other words, the decision making process regarding lobbying activity is completely decentralized and independent. Since the political activities are assumed to be less profitable from an individual firm’s point of view than the production activities, the managers (or the body of employees as discussed in Section 2) have little incentive to put their efforts to the policy-influencing activity. As one can easily notice, this is a typical example of failure of collective action firstly analyzed by Olson (1965).

Rather paradoxically, it turns out that adding one imperfection to another can mitigate the both problem, i.e. it is shown that the firms can "solve" the collective action problem only if at least one firm suffers a severe moral-hazard problem. Furthermore, by solving the collective action problem, they can mitigate the moral-hazard problem as well. Motivated by ample studies on political economy in Japan, I argue that hiring ex-bureaucrats, often called as amakudari literally meaning "descent from heaven", can be a commitment to participate in government-related activities in the future. However, this commitment device becomes actually at use only when a firm’s pledgeable income is too low to stand alone. In such a case, other firms which would benefit from the government-related activities might have incentives to invest to the firm hiring

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1Details on the meaning of "amakudari practice" in Japanese political economy are provided in Section 2.
ex-bureaucrats even though the direct return from the investment is expected to be low. Thus, the theoretical
model predicts a firm tends to hire more ex-bureaucrats if more shares are held by other firms or financial
intermediaries.

In the second half of the paper, I test the prediction using the data of about 2300 publicly traded firms
annually observed from year 1991 to 2003. Following the previous studies on amakudari practice, I examine
which characteristics of a firm are likely to increase the number of ex-bureaucrats in the firm’s boardroom.
But the present work differs from the existing studies mainly in two ways. First, I exploit the panel structure
of the data, and allow the unobserved heterogeneity to be arbitrarily correlated with observed explanatory
variables. Second, facing the apparent endogeneity existing in the data, I address the issue via control
function approach.\textsuperscript{2} (See Wooldridge (2010).) Findings are consistent with the theoretical prediction. Both
shareholdings by other non-financial firms and those by financial institutions have statistically significant
effects, and the sizes of the effects remain stable when various control variables are added in the estimation
equation. During the sample period, the number of ex-bureaucrats in the boards increases by 4 percent
when other firms’ shareholdings increase by one percent point. Similarly, one percent point increase in the
shareholdings of financial institutions increases the number of amakudari by 2.7 percent.

These findings are broadly consistent with other theories and arguments on the political rent seeking
behavior of business groups. However, it is not difficult to see that none of them is fully satisfactory, and the
model presented in this paper fits better to the situation of Japan. First, one may want to argue that lobbying
activity is enforceable by major shareholders in contrast to the assumption of this paper, and business groups
are in good positions to internalize the positive externalities generated by government policy. Then obviously,
the firms affiliated in a business group would participate in lobbying activity more aggressively. Indeed, this
seems the case in many developing countries with poor investor protection. Moreover, in a study of pyramidal
business groups, Morck and Yeung (2004) list four advantages that business groups have in lobbying: vast
resources, lower coordination costs, ability to impute costs into other subsidiaries, and social networks among
elites (see also Morck, Wolfenzon and Yeung (2005)).

Even though this explanation seems consistent with the finding of this paper, it also raises several other
questions. For instance, if we believe the business groups make decisions in a centralized manner, it is not easy
to understand why the ex-bureaucrats are concentrated in subsidiaries. If the "headquarter" of a business
group can enforce an affiliated firm to participate in lobbying, it is natural to believe that it could also simply

\textsuperscript{2}One advantage of control function approach is that it provides a simple test for endogeneity. The hypothesis that there is
no endogeneity problem is rejected in all specifications.
do it by itself, and impute the cost to the others. Another question arises from the observation that in the sample analyzed in this paper, almost 40% of them have at least one director whose former employer is the government or the public companies. One would also wonder why so many private firms hire ex-bureaucrats because it seems redundant for many firms in a single business group to hire ex-bureaucrats by themselves. One can also question the validity of the premises because in contrast to the misconceptions about Japanese economy, pyramidal business groups are rare in Japan, and the business groups do not make a centralized decision. Regarding this matter, more details can be found in Section 2.

Second, closely related to the first one, it is easy to imagine that if shareholders can freely appoint the members of the board, a firm owned by other firms who would benefit from the focused firm’s political activities is likely to appoint ex-bureaucrats as its director and to participate in lobbying activities. This is a simple variation of internalization of externality story. The empirical findings and the stylized facts on Japanese political economy do not rule out this possibility, but it is hardly the entire story. According to studies on corporate governance in Japan, most of directors and managers are selected from among employees. In other words, the body of employees selects directors to be its representatives. Hence, a model which explains why the body of employees voluntarily selects ex-bureaucrats as its member of boards is in need.

Finally, Berglof and Perotti (1994) provide a formal model of business group (keiretsu) where a group of firms hold each other’s debt and equity, and make cooperative decisions in a mutually beneficial way. Key feature of the model is the repeated interaction over time which allows the firms to punish each other’s misbehaviors. But once the repeated interaction is introduced in the picture, shareholdings become a redundant factor. Studies on endogenous lobby formation, including Pecorino (1998) and Magee (2002), show that firms can solve collective action problem without any help of financial linkage if they interact in a repeated manner. In short, Berglof and Perotti’s model is consistent with the findings of this paper, but it just shows one of many possibilities.

The theory presented in this work has some desirable features over the possible explanations discussed above. First, decision makings are decentralized, which seems closer to the reality. Second, in all of the above mentioned theories, hiring ex-bureaucrats is just one of the many ways to "buy influence." In contrast, hiring ex-bureaucrats is crucial in solving the collective action problem in my model. Lastly, my model does not rely on repeated interaction which often fails to generate sharp empirical implications. Instead, I allow firms to freely invest to each other in one-shot dynamic game. And, the model predicts that a firm might

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3The number of directors who worked in public companies before is relatively very small.
try to attract other firms’ investment by hiring ex-bureaucrats.

1.1 Related literature

- finance and political economy
  - formation of business groups: history, theories (pyramid - outside of Japan)
  - endogenous lobby formation

2 Stylized Facts in Japanese Political Economy

2.1 The body of employees as controlling group

who is the controlling group? a central question for organization theory according to Simon (1976)

According to Miwa (1996), "with the importance of employees’ investment in organization-specific human capital formation, the body of employees takes this key position, and selects directors to be its representatives." (p.196) By taking a close look at a large number of representative Japanese firms, he argues, "employees are the most important stakeholders in most large Japanese firms, which means that the controlling group is the body of employees. In such firms, the directors and managers are selected from among employees, and are almost always able to expect strong support from the majority of employees, as long as their decision making is generally consistent with employees’ interests."

for a detailed study on the composition of boards of directors in Japan, see Miwa and Ramseyer (2005)

2.2 Amakudari: Informal networks

- channel of corruption
  - push: in regulatory purposes, the government pushes the firms to hire amakudari
  - pull: firms pull amakudari to build informal networks
  - push & pull: supply & demand. Both factors are at work, but our focus is on the pull side
  - lobby in Japan: illegal, network, informality
  - commitment device: relationship with the government: Horiuchi and Shimizu (2001)

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4Empirical research in this strand of work is relatively rare. One exception is Damania et al. (2004).
2.3 Business groups

the fable of keiretsu: Miwa and Ramseyer (2002)

decentralized decision making

3 Theory

Based on the discussion in the previous section, I present a simple model which illustrates a situation where hiring ex-bureaucrats is crucial in overcoming the collective action problem. The goal of theoretical model is threefold. i) illustrating a situation where hiring ex-bureaucrats is a necessary condition for overcoming the collective action problem. ii) providing welfare analysis iii) providing comparative statics to understand the historical change. For the sake of convenience, in this section I will call a body of employees discussed above "a firm."

3.1 Basic Model

I consider a simple moral-hazard model with two firms and many outside investors. All agents are risk neutral. Firm \( i (i = 1, 2) \) is endowed with cash-at-hand \( A_i \), and needs to invest an amount \( I \) in order to start or continue a project. The project conducted by firm \( i \) generates a verifiable profit \( R_i \) in case of success and zero otherwise. The probability of success \( z_i \) is assumed to be a linear function of efforts put in different activities:

\[
z_i = \min \{e_i + \gamma l_i + \delta l_j, 1\}
\]

where \( e_i \geq 0 \) is the effort (or resources) put in productive activity, \( l_i \geq 0 \) is that in government-related activity (lobbying), and neither of them is contractable. Given the levels of efforts, the event of success of a project is independent from the other. Both \( \gamma \) and \( \delta \) are positive constants, which means the government-related activity generates a positive externality to the other firm. (industry level policy, vertical chain)

Given the effort levels, the cost incurred in running the project is

\[
c(e_i, l_i) = \beta (e_i + l_i)^2 / 2.
\]

Following Olson (1965), I assume the firms face a collective action problem with regard to lobbying, i.e. \( \delta \leq \gamma < 1 \) and \( \gamma + \delta > 1 \). It is clear that under these assumptions, no firm has an incentive to put its effort in lobbying as far as it can undertake the project without another firm’s investment. Although
Figure 1: Timeline

$l_i$ is not contractable, by hiring ex-bureaucrats firm $i$ can make a commitment to participate in lobbying. Specifically, it can choose lower bound $a_i$ so that $l_i \geq a_i$. I assume, for simplicity, $a_i \in \{0, \pi\}$. (identity in work place, monitoring efficiency) To rule out corner solutions, I assume

$$\beta \bar{a} < R_i < \beta (1 - \delta \bar{a})$$

(A1)

for all $i$.

Due to limited liability, an investor cannot be paid if the firm has zero cash-flow. Since all agents are risk neutral, the efficient contract is that firm $i$ pays out a share $\theta_i$ of the verifiable cash-at-hand after the outcomes of the projects are realized.

The timing of the events is depicted in Figure 1. At the first stage, the firms choose whether to hire ex-bureaucrats or not. At the contract stage, the firms undertaking the projects post a take-it-or-leave-it offer. The firms choose the effort level $e_i$ and $l_i$ at the third stage. Given the effort levels, the random outcomes are realized, and the profits are distributed according to the contracts.

3.2 Analysis

Let us first suppose the firms do not invest to each other. Then, the optimal contract $\theta^*_i$ solves:

$$\max_{\theta_i \in [0,1]} (1 - \theta_i) (e_i + \gamma l_i + \delta l_j) R_i - \beta (e_i + l_i)^2 / 2$$

subject to

$$(e_i, l_i) \in \arg \max_{e_i, l_i \geq a_i} (1 - \theta_i) \left( \tilde{e}_i + \gamma \tilde{l}_i + \delta \tilde{l}_j \right) R_i - \beta \left( \tilde{e}_i + \tilde{l}_i \right)^2 / 2$$

$$\theta_i (e_i + \gamma l_i + \delta l_j) R_i \geq I - A_i$$

7
I normalize the market interest rate to zero, so the participation constraint for investors is a make-even condition.

To characterize the optimal contract, first note that the firms have no incentive to set \( l_i \) above the lower bound, i.e. \( l_i^* = a_i \). Hence, the optimal effort level is derived from the first-order condition as

\[
e_i^* = \max \left\{ (1 - \theta_i)R_i / \beta - a_i, 0 \right\}.
\]

This result being applied, the above program can be rewritten as follows.

\[
\max_{\theta_i \in [0, 1]} \frac{(1 - \theta_i)^2 R_i^2}{2 \beta} + (1 - \theta_i) [\delta a_j - (1 - \gamma) a_i] R_i
\]

subject to

\[
\frac{\theta_i(1 - \theta_i) R_i^2}{\beta} + \theta_i [\delta a_j - (1 - \gamma) a_i] R_i \geq I - A_i.
\]

It is obvious that firm \( i \) sets \( a_i = 0 \) because an increase in \( a_i \) reduces the payoff, and tightens the constraint at the same time. The constraint should bind at the optimum, so the optimal \( \theta_i^* \) is the smaller solution of the following equation.

\[
\theta_i(1 - \theta_i) R_i^2 / \beta = I - A_i
\]

Note that if \( R_i^2 / 4 \beta + A_i < I \), there is no real root for equation (1). It means that firm \( i \) cannot undertake the project because its pledgeable income is too low.

Now consider the financing contract between the firms. In what follows, I assume

\[
\frac{R_2^2}{4 \beta} + A_2 < I < \frac{R_2^2}{4 \beta} + A_1,
\]

so only firm 1 can stand alone. Specifically, firm 1 invests amount \( \Delta \) to the project run by firm 2, and firm 2 pays out a share \( \tau \) of the total profit. Because \( a_1 = 0 \), firm 1 maximizes:

\[
\max_{\theta_1 \in [0, 1], \Delta \geq 0} (1 - \theta_1) [(e_1 + \delta a_2) R_1 + \tau (e_2 + \gamma a_2) R_2] - \beta e_1^2 / 2
\]

subject to

\[
e_1 = (1 - \theta_1) R_1 / \beta
\]

\[
\theta_1 [(e_1 + \delta a_2) R_1 + \tau (e_2 + \gamma a_2) R_2] \geq I - (A_1 - \Delta).
\]

And, the optimal contract that firm 2 offers solves

\[
\max_{\theta_2, \tau \in [0, 1]} (1 - \theta_2 - \tau)(e_2 + \gamma a_2) R_2 - \beta (e_2 + a_2)^2 / 2
\]

8
subject to

\[ e_2 = \frac{(1 - \theta_2 - \tau)R_2}{\beta} - a_2 \]  
\[ \theta_2(e_2 + \gamma a_2)R_2 \geq I - (A_2 + \Delta) \]  
\[ U_1^*(\theta_2, \tau|\theta_1, \Delta) \geq U_1^* \]

where \( U_1^* \) is the payoff for firm 1 when it stands alone, and \( U_1^*(\theta_2, \tau|\theta_1, \Delta) \) is the solution of (2) as a function of \((\theta_2, \tau)\). The equilibrium contract \((\hat{\theta}_1, \hat{\Delta}, \hat{\theta}_2, \hat{\tau})\) simultaneously solve (2) and (3).

**Proposition 1** Suppose \( R_2^2/4\beta + A_2 + \varepsilon = I \) with \( \varepsilon \) not too large. There exists an equilibrium contract \((\hat{\theta}_1, \hat{\Delta}, \hat{\theta}_2, \hat{\tau})\) such that firm 1 invests to firms 2 \((\hat{\Delta} > 0)\) if and only if firm 2 hires ex-bureaucrats \((a_2 = \pi)\).

**Proof.** Note first that \( \hat{\Delta} \) must be zero if \( a_2 = 0 \) because firm 1’s expected return would be identical with that of outside investors, yet assumption (A2) says the investment is not profitable enough. So let us suppose \( a_2 = \pi \), and characterize the optimal contracts. As seen before, firm 1 wants to minimize \( \theta_1 \), so constraint (IR1) must bind:

\[
\theta_1 \left[ \frac{(1 - \theta_1)R_1^2}{\beta} + \delta a_2 R_1 + \tau \left\{ \frac{(1 - \theta_2 - \tau)R_2}{\beta} - (1 - \gamma)a_2 \right\} R_2 \right] = I - (A_1 - \Delta) \]  
(4)

Because the optimal \( \theta_1 \) is the smaller solution of the above equation, \( \hat{\theta}_1 \) is increasing in \( \Delta \). It means firm 1 sets \( \Delta \) either the amount just enough for survival or zero. So an equilibrium contract with \( \hat{\Delta} > 0 \) does not exist if firm 2 can stand alone. Substituting (IC2) into (IR2), notice that the right-hand-side of (IR2) is a concave second-order function of \( \theta_2 \) which is maximized at

\[
\theta_2 = \frac{1}{2} \left[ 1 - \tau - (1 - \gamma) \frac{a_2 \beta}{R_2} \right]. \]  
(5)

If constraint (IR2) binds, it can be rewritten as

\[
\Delta = I - A_2 - \theta_2 \left[ \frac{(1 - \theta_2 - \tau)R_2}{\beta} - (1 - \gamma)a_2 \right] R_2 \]  
(6)

Since firm 1 sets \( \Delta \) just enough for firm 2’s survival, equation (5) and (6) jointly determine \((\hat{\Delta}, \hat{\theta}_2)\). If constraint (IR3) binds, it can be rewritten as

\[
(1 - \theta_1) \left[ \frac{(1 - \theta_1)R_1^2}{2\beta} + \tau \left( \frac{(1 - \theta_2 - \tau)R_2^2}{\beta} + a_2 (\delta R_1 - \tau(1 - \gamma)R_2) \right) \right] = \frac{(1 - \theta_1^*)^2R_1^2}{2\beta} \]  
(7)
where $\theta_1^*$ is the smaller solution of equation (1). Denote \((\theta_1^{**}, \Delta^{**}, \theta_2^{**}, \tau^{**})\) the solution of simultaneous equation system (4), (5), (6) and (7), and \((\tilde{\theta}_1, \tilde{\Delta}, \tilde{\theta}_2, \tilde{\tau})\) the solution of simultaneous equation system (4), (5), (6) and $\tau = 0$.\(^5\) Then, the equilibrium contract is

$$
(\tilde{\theta}_1, \tilde{\Delta}, \tilde{\theta}_2, \tilde{\tau}) = \begin{cases} 
(\theta_1^{**}, \Delta^{**}, \theta_2^{**}, \tau^{**}) & \text{if } \tau^{**} \geq 0 \\
(\tilde{\theta}_1, \tilde{\Delta}, \tilde{\theta}_2, \tilde{\tau}) & \text{otherwise.}
\end{cases}
$$

To show \((\tilde{\theta}_1, \tilde{\Delta}, \tilde{\theta}_2, \tilde{\tau})\) indeed exists, suppose $R_2^2/4\beta + A_2 + \varepsilon = I$ where $\varepsilon$ is a very small positive number. Then, $\Delta$ needed for firm 2’s survival must be positive but very small. It means the IR condition for firm 1 is loosened compared to that when it does not invest to firm 2 (see equation (4)), so the equilibrium $\theta_1$ must be smaller than $\theta_1^*$, i.e. firm 1 is better off. Therefore, $\tau$ should be zero, and one can easily see that $\theta_2$ is a positive number from (A1) and equation (5). So, there exists an equilibrium contract with $\Delta > 0$. \(\blacksquare\)

Note that an equilibrium contract with $\Delta > 0$ does not exist if firm 2 can stand alone. This implies, rather paradoxically, an equilibrium where the firms "overcome" the collective action problem exists only when the moral-hazard problem is sufficiently severe. Moreover, the following proposition shows that the moral-hazard problem can be mitigated by solving the collective action problem.

**Proposition 2** Suppose the equilibrium with $a_2 = \bar{a}$ exists. Then, hiring ex-bureaucrats might be welfare improving in the sense that both $e_1$ and $e_2$ increase due to the practice.

**Proof.** Suppose $R_2^2/4\beta + A_2 + \varepsilon = I$ where $\varepsilon$ is a very small positive number. Then, $\Delta$ needed for firm 2’s survival is also very small. It means the IR condition for firm 1 is loosened (see equation (4)), so the equilibrium $\theta_1$ must be smaller than $\theta_1^*$. Recall that the optimal level of $e_1^*$ is a decreasing function of $\theta_1^*$. So the effort level of firm 1 increases. It is obvious that $e_2$ cannot decrease since $e_2 = 0$ if it fails to attract enough investment. \(\blacksquare\)

The analysis thus far provides some implications for empirical investigation. First of all, if a non-negligible part of shares of a firm is held by other firms, then the focused firm is more likely to hire ex-bureaucrats than a firm mostly owned by individual investors does. Second, one should be careful when try to measure the effect of amakudari on the firm’s performance. Because hiring ex-bureaucrats can be a strategy for less productive firms, the estimates might suffer selection bias.

\(^5\)Take the smaller roots for $\theta_1$ and $\tau$. 
4 Data and Empirical Strategy

4.1 Data description

The source of data is Nikkei Annual Corporation Reports issued in 1992 to 2004. Since each issue covers the previous year, the actual sample period is from 1991 to 2003. The information contained in the report is hardly exhaustive, but it includes the former employer of all the board members, and the shareholdings by six different types of owners: the government, other non-financial firms, financial institutions, securities companies, foreigners, and the rest. Here, most of "the rest" are individual investors. So, we do not know the identities of the owners, but do know which categories they are in.

Among these, each of the shares held by non-financial firms, financial institutions, and the rest accounts for 30% of all stockholdings, and the sum of shares held by the government, securities companies, and foreigners accounts for 10%. Because the shares held by the latter three are relatively small, and it is often argued that their role in capital market is very minor (see for example, Aoki (1990), pp.102-124), I do not utilize those shareholding variables in the analysis.

Following the previous studies on the conditional distribution of amakudari, I employ the number of ex-bureaucrats hired in private firms as board members as the dependent variable. Table 1 shows the summary statistics of the dependent variable. Over the sample period, entrances and exits occur in every industry, and ex-bureaucrats are newly hired and fired in most of the firms. So I report the averaged numbers in Table 1. A couple of observations are noteworthy. First, about 40% of the firms in the sample have at least one amakudari in their boardrooms. Second, there are large differences across industries. In rubber industry, there are only two firms out of twenty which have an ex-bureaucrat. In contrast, more than 60% of the firms have at least one amakudari in construction, finance, air transportation, and electric power and gas industry.
Table 1: Number of ex-bureaucrats (average over the sample period)

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. of firms</th>
<th>Firms with ex-bureaucrats (%)</th>
<th>No. of ex-bureaucrats</th>
<th>Median</th>
<th>Mean</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry &amp; fishing</td>
<td>7.92</td>
<td>70.87</td>
<td>1</td>
<td>0.612</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td>10.62</td>
<td>29.71</td>
<td>0</td>
<td>0.795</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>170.38</td>
<td>71.74</td>
<td>1</td>
<td>1.803</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Foods</td>
<td>117.69</td>
<td>32.15</td>
<td>0</td>
<td>0.236</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td>81.77</td>
<td>18.44</td>
<td>0</td>
<td>0.101</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pulp &amp; paper</td>
<td>30.69</td>
<td>21.8</td>
<td>0</td>
<td>0.13</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>206.31</td>
<td>28.6</td>
<td>0</td>
<td>0.194</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Petroleum</td>
<td>12.39</td>
<td>47.2</td>
<td>0</td>
<td>0.311</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td>21.92</td>
<td>9.12</td>
<td>0</td>
<td>0.025</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Glass &amp; ceramics</td>
<td>57.62</td>
<td>16.42</td>
<td>0</td>
<td>0.079</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Iron &amp; steel</td>
<td>57.08</td>
<td>24.12</td>
<td>0</td>
<td>0.145</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Nonferrous metals</td>
<td>38.23</td>
<td>34</td>
<td>0</td>
<td>0.175</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Metal products</td>
<td>69.31</td>
<td>33.41</td>
<td>0</td>
<td>0.437</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Machinery</td>
<td>199.38</td>
<td>22.84</td>
<td>0</td>
<td>0.13</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electric machinery</td>
<td>203.77</td>
<td>43.68</td>
<td>0</td>
<td>0.247</td>
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<tr>
<td>Transportation equipment</td>
<td>90.77</td>
<td>30.76</td>
<td>0</td>
<td>0.223</td>
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<tr>
<td>Precision equipment</td>
<td>35.23</td>
<td>29.91</td>
<td>0</td>
<td>0.092</td>
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<tr>
<td>Other manufacturing</td>
<td>80.08</td>
<td>32.95</td>
<td>0</td>
<td>0.16</td>
<td>3</td>
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<tr>
<td>Commerce</td>
<td>334.54</td>
<td>33.11</td>
<td>0</td>
<td>0.208</td>
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<tr>
<td>Finance</td>
<td>165.46</td>
<td>67.97</td>
<td>0</td>
<td>0.612</td>
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<tr>
<td>Insurance</td>
<td>13.15</td>
<td>21.64</td>
<td>0</td>
<td>0.099</td>
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<tr>
<td>Real estate</td>
<td>38.69</td>
<td>42.15</td>
<td>0</td>
<td>0.382</td>
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<tr>
<td>Land transportation</td>
<td>54.15</td>
<td>49.15</td>
<td>0</td>
<td>0.504</td>
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<tr>
<td>Shipping</td>
<td>22.31</td>
<td>26.89</td>
<td>0</td>
<td>0.086</td>
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<tr>
<td>Air transportation</td>
<td>5.23</td>
<td>94.12</td>
<td>2</td>
<td>2.368</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Warehouse &amp; wharfting</td>
<td>33.23</td>
<td>28.01</td>
<td>0</td>
<td>0.113</td>
<td>2</td>
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</table>
4.2 Empirical Strategy

First recall that there are "push" factors and "pull" factors working in determining the distribution of ex-bureaucrats. Since the interest of the present paper is in "pull" side, an important question is how to control "push" factors in a reasonable way. I assume this push factors are constant over time and additively separable from other explanatory variables. In estimation equation, it will be captured by the scalar unobserved heterogeneity. I allow the unobserved heterogeneity to be arbitrarily correlated with the other explanatory variables by employing fixed effect Poisson model. Furthermore, I repeat the analysis after dropping the supposedly highly regulated industries out from the sample in order to check robustness of the results obtained with the full sample.

The other task one have to deal with is potential endogeneity generated by firms’ strategic decision makings. Arguably, the size of a firm does not change rapidly in response to a change in the composition of its board of directors. Similarly, the presence of ex-bureaucrats in boardroom would not strongly affect whether the employees are unionized or not. According to the theory, however, some variables such as shareholdings and sales are jointly determined with the number of ex-bureaucrats in boardroom. Even if the theory is completely wrong and irrelevant, those variables are rather volatile, and are likely to be affected by the composition of board of directors. Thus, unless this endogeneity problem properly taken care of, one would not be able to capture the causal relationships underlying in the data. To deal with such endogeneity,

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6. push: in regulatory purposes, the government pushes the firms to hire amakudari
- pull: firms pull amakudari to build informal networks

---
I adopt the following assumption.

\[ E(y_{it}|X_{it}, h_i, \bar{y}_{It}, \bar{X}_{It}) = E(y_{it}|X_{it}, h_i, \bar{y}_{It}) \]

where \( X_{it} \) is a vector of the explanatory variables, \( h_i \) is a scalar unobserved heterogeneity, \( \bar{y}_{It} \) is the average of \( y_{it} \) at the industry level, and \( \bar{X}_{It} \) is the average of \( X_{it} \) at the industry level. In other words, since every causal factor working at the industry level is wholly captured by \( \bar{y}_{It} \), all the other industry level variables can be excluded from the equation. Thus, under this assumption, \( \bar{X}_{It} \) can be used as an instrument for \( X_{it} \).

The industry level average of the dependent variable \( \bar{y}_{It} \) require extra considerations. Even though \( \bar{y}_{It} \) must be correlated with the error term in the estimation equation, the correlation must not very large because the number of firms in an industry is large enough. So one can expect that the bias generated by the correlation must be also very small. Moreover, I conduct a separate analysis where \( \bar{y}_{It-1} \) is introduced as an instrument for \( \bar{y}_{It} \). I do not report the results since they are almost the same with the one reported.

Based on above assumptions, the actual estimation procedure is as follows. In the first stage of estimation, I regress the endogenous variable(s) on the other explanatory variables and the industry level average of that endogenous variable(s), and keep the residuals. In the second stage, I use fixed effect Poisson regression with all the explanatory variables and the residuals kept from the first stage. Because estimation errors generated in the first stage remain in the residuals, for valid inference one should take that into account. I report the standard errors generated by bootstrap.

### 5 Empirical Results

Table 2 shows the main empirical results of this paper. The numbers are the coefficients of fixed effect Poisson regression, and are also happened to be the marginal effects since the average number of ex-bureaucrats in the full sample is 1.0012. The numbers in parentheses are standard errors generated by bootstrap. The number of observations used in actual estimation is 11506 which is far smaller than 30126, that of the total observation. This is because the observations of a firm are not used in fixed effect Poisson estimation if the firm never hires ex-bureaucrat over the entire sample.

First note that the shareholdings variables are positive and statistically significant at 1% in all specification, which confirms the prediction of the theoretical model. During the sample period, the number of ex-bureaucrats in the boards increases by 4 percent when other firms’ shareholdings increase by one percent point. Similarly, one percent point increase in the shareholdings of financial institutions increases the number
of *amakudari* by 2.7 percent.

The most significant variable in terms of $t$-value is the industry level average of the dependent variable. That shows the factors working at industry level are non-negligible. The sales in the previous year (the performance measure) is significant at 5% in some specifications, but not in other specifications. The number of employees (the measure for size of firms) and unionization of labor are not statistically significant in any specification.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharesholdings by non-financial firms</td>
<td>0.04438</td>
<td>0.03791</td>
<td>0.03705</td>
<td>0.04096</td>
<td></td>
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<tr>
<td>Sharesholdings by financial institutions</td>
<td>(0.00685)</td>
<td>(0.00713)</td>
<td>(0.00816)</td>
<td>(0.00768)</td>
<td></td>
<td></td>
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<tr>
<td>Sales in the previous year</td>
<td>1.93641</td>
<td>2.79446</td>
<td>1.5833</td>
<td></td>
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</tr>
<tr>
<td>(0.95438)</td>
<td>(0.81382)</td>
<td>(0.92501)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Labor unionization</td>
<td>0.02117</td>
<td>0.10653</td>
<td>0.04165</td>
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<tr>
<td>(0.07495)</td>
<td>(0.07591)</td>
<td>(0.07644)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td>0.80074</td>
<td>1.32004</td>
<td>-0.86925</td>
<td>0.49126</td>
<td></td>
<td></td>
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<tr>
<td>(0.53858)</td>
<td>(0.57318)</td>
<td>(0.54992)</td>
<td>(0.58861)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Size of board of directors</td>
<td>0.01848</td>
<td>0.017</td>
<td>0.0084</td>
<td>0.00679</td>
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<tr>
<td>(0.00259)</td>
<td>(0.0027)</td>
<td>(0.00318)</td>
<td>(0.00327)</td>
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<tr>
<td>Industry average of ex-bureaucrats</td>
<td>0.50617</td>
<td>0.49013</td>
<td>0.53301</td>
<td>0.32536</td>
<td>0.36234</td>
<td>0.42749</td>
</tr>
<tr>
<td>(0.02637)</td>
<td>(0.02871)</td>
<td>(0.03526)</td>
<td>(0.03019)</td>
<td>(0.03459)</td>
<td>(0.03819)</td>
<td></td>
</tr>
</tbody>
</table>

In the following, to deal with the concern that the results might be seriously affected "push" factors, I exclude the firms in highly regulated industries including finance, air transportation, communications, and electronic power and gas industries from the sample. And, I also drop construction industry because it is often argued that ex-bureaucrats in construction industry are involved in government procurement contracts which have little positive externality to other firms. The results reported in Table 3 are not very different from those in Table 2.
The number of observations used in this estimation is 6407. And, the average number of amakudari over the whole period is 0.69064, so the marginal effects are proportionally smaller than the coefficients reported in Table 3.

Table 3: Highly regulated industries excluded

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
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</thead>
<tbody>
<tr>
<td>Shareholdings</td>
<td>0.04252</td>
<td>0.03593</td>
<td>0.04540</td>
<td>0.04099</td>
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<tr>
<td>by non-financial firms</td>
<td>(0.01137)</td>
<td>(0.00949)</td>
<td>(0.01063)</td>
<td>(0.01143)</td>
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<td></td>
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<tr>
<td>Shareholdings</td>
<td>0.01864</td>
<td>0.02267</td>
<td>0.01998</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>by financial institutions</td>
<td>(0.00379)</td>
<td>(0.00596)</td>
<td>(0.00723)</td>
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<td></td>
</tr>
<tr>
<td>Sales in the previous year</td>
<td>-2.31693</td>
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<td>-2.94267</td>
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<tr>
<td></td>
<td>(0.95438)</td>
<td>(1.35836)</td>
<td>(1.68878)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor unionization</td>
<td>0.08823</td>
<td>0.09333</td>
<td>0.07552</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.11000)</td>
<td>(0.10778)</td>
<td>(0.10944)</td>
<td></td>
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</tr>
<tr>
<td>Number of employees</td>
<td>1.39043</td>
<td>1.75457</td>
<td>-0.11923</td>
<td>1.03120</td>
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<tr>
<td></td>
<td>(0.63279)</td>
<td>(0.68197)</td>
<td>(0.62645)</td>
<td>(0.71621)</td>
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<tr>
<td>Size of board of directors</td>
<td>0.01065</td>
<td>0.01019</td>
<td>-0.00173</td>
<td>0.00123</td>
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<tr>
<td></td>
<td>(0.00352)</td>
<td>(0.00364)</td>
<td>(0.00432)</td>
<td>(0.00481)</td>
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<tr>
<td>Industry average of ex-bureaucrats</td>
<td>2.03429</td>
<td>2.13452</td>
<td>2.03991</td>
<td>2.26986</td>
<td>2.3664</td>
<td>2.02213</td>
</tr>
<tr>
<td></td>
<td>(0.19134)</td>
<td>(0.19419)</td>
<td>(0.21356)</td>
<td>(0.15495)</td>
<td>(0.18879)</td>
<td>(0.21073)</td>
</tr>
</tbody>
</table>

6 Historical Changes of Japanese Economy

7 Conclusion

References


[14] La Porta, Rafael, Florencio Lopez-de-Silanes and Andrei Shleifer (1999), Corporate ownership around the world, *Journal of Finance* LIV(2), 471-517


[23] Raj, Manoj and Takeshi Yamada (2009), Business and Government Nexus: Retired Bureaucrats in Corporate Boardrooms, working paper

