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Did *Amakudari* Undermine the Effectiveness of Regulator Monitoring in Japan?

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Abstract

This paper investigates how the human relationship prevailing between the regulatory authorities and private banks referred to as "*amakudari*" has influenced the effectiveness of prudential regulation in Japan. We propose a simple model of repeated game to explain the *amakudari* phenomenon. Our model shows the regulatory authorities utilize monitoring as a tool of obtaining the self-enforcing *amakudari* relationship at the expense of stringent supervision. The statistical analysis in this paper supports the hypotheses derived from this model. Thus, our paper suggests that the traditional *amakudari* relationship undermines the prudence of bank management, thereby leading to the fragile banking system in Japan. This paper stresses importance of making the monitoring procedures implemented by the regulatory authorities more transparent in order to prevent abuse of discretionary power by the authorities.

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I Introduction

Banks have been recognized as important monitors which reduce the problems arising from asymmetric information between lenders and borrowers.1) However, as Diamond(1984) emphasizes, the financial system must resolve the issue of how to motivate banks efficiently and/or prudently play the role of monitor.2) This issue is not trivial because it is difficult for outsiders to observe banks' monitoring activities and to assess their efficiency and prudence. Thus, a financial system centered on bank lending such as the Japanese one has to face the problem of "who monitors the monitor (i.e., banks)."

Obviously, this issue is related to the governance structure of bank management. As Dewatripont and Tirole(1994) and Prowse(1995) point out, the ownership structure of banks is so diffused that we can not rely on outside investors to have the incentives to monitor bank management. In addition, the safety net for purposes of protecting a wide range of depositors and other investors weakens market incentives to monitor and discipline bank management. Dewatripont and Tirole(1994) propose the representative hypothesis stating that the government should be a representative of outside investors, particularly depositors, to monitor and discipline bank management. Actually, the monetary authority is empowered to intervene into many aspects of bank management.

In Japan, the banking law authorizes the Ministry of Finance (MOF) to supervise the management of individual banks, to order them to stop their operations, to dismiss bank directors, and to cancel licenses for banking if necessary. The MOF also requires the banks to manage themselves prudently and to satisfy some standards of managerial soundness such as capital adequacy ratios through administrative guidance. The recent problem of bad loans in the Japanese banking industry also reveals how the MOF actively intervenes in the process of dealing with the banks in distress (Horiuchi(1996)). Thus, the monetary authority is the overwhelmingly important stake-holder in the governance of bank management so that, as Kane(1989) suggests, the issue who monitor the monitor is closely related to another issue how

we should motivate the regulator to monitor bank management.

What kind of incentive devices do there exist to motivate the regulators to exercise their delegated authority in an efficient way? In this context, the human relationship between the regulator and private businesses may be important. Aoki, Patrick and Sheard(1994) (hereafter AP&S) argue that the flow of human resources from the bureaucracy to business sector called "*amakudari*" (descending from heaven) in Japanese has been an effective incentive system of disciplining public servants in Japan. Most banks, particularly small and mideum-sized ones, have routinized accepting high ranked officials from the Ministry of Finance (MOF) and the Bank of Japan (BOJ) in their board of directors (Calder(1993) and Rixtel(1994)). AP&S regard post-retirement job opportunities have disciplined bureaucrats to faithfully pursue the goals delegated to them by taxpayers.

However, as they recognize, there exists a danger of an agency problem (or a moral hazard problem) in this system, because the bureaucrats are delegated a role of monitoring on the one hand, and they expect to be employed by the institutions to be monitored by them on the other hand. AP&S argue this problem has been resolved by the system in which not individual bureaucrats but the bureaucracy in itself arranges who should be employed by which banks after retirement. This paper shows their argument is not necessarily true. We introduce a simple model of the repeated game between the regulatory authority and a private bank where the bureaucracy is systematically arranging jobs for its retirees. This paper shows that *amakudari* is a self-enforcing long-run relationship between the regulatory authority and a private bank where the bank accepting *amakudari* enjoy "soft" monitoring by the regulator. According to our model, the *amakudari* relationship undermines the effectiveness of regulator monitoring thereby leading to the fragile banking system in Japan. This theoretical result is consistent with what we observe with respect to the relationship between *amakudari* and bank performance.

This paper is organized as follows. The next Section II introduces a repeated game played by the regulatory authority and a private bank. This model explains the *amakudari* relationship as the cooperative equilibrium characterized by lower level of

monitoring by the regulator. The refutable hypotheses derived from this model are empirically tested in Section Ⅳ. Before proceeding to the empirical analysis, in Section Ⅲ we summarize some statistical evidence about *amakudari* in the Japanese banking industry by making use of a sample consisting of 125 regional banks. The descriptive statistics shows that the banks accepting *amakudari* officials from the MOF had, on average, a smaller amount of equity capital and a larger amount of bad loans than the banks independent from the *amakudari* relationship.

Section Ⅳ investigates the same issue by introducing econometric methods to examine how the *amakudari* relationship influences bank performance, particularly soundness of bank management. We also test what factors can explain banks' decision making of whether or not to accept *amakudari* by a probit method. These analyses do not reject the hypothesis that *amakudari* from the MOF tends to decrease banks' equity capital and to increase their bad loan ratios. Finally, Section Ⅴ summarizes our discussion in this paper.

II *Amakudari* Relationship in a Simple Repeated Game

The regulatory authority should take the responsibility for monitoring bank management. As the Bank Law authorizes the MOF, it would not be very difficult for the MOF to monitor banks management and to penalize those which disobey the prudential regulations. However, the following simple model shows that the long-term relationship between the regulatory authorities and private banks through *amakudari* would undermine effectiveness of monitoring by regulators.3)

In the following discussion, we assume the regulatory authority and a bank play a repeated game by exchanging acceptance of officials from the authority and monitoring. From this assumption, we derive a result that the *amakudari* is a self-enforcing mechanism in which the authority and a bank provide benefit with each other; i.e., the authority is able to keep remunerative job opportunity for its retirees and a private bank enjoys "soft" monitoring to allow more risky management.4)

A repeated game

We assume the regulatory authority (G) and a bank (B) play a infinitely repeated game. In this game, the authority determines the strength of monitoring and the bank decides whether to accept *amakudari* officials from the authority (A) or not (N) in every period. There are two degree of monitoring strength; i.e., high (H) and low (L). The high level monitoring (H) will bring forth less risky bank management (R_H), and the low level monitoring (L) will lead to more risky bank management(R_L) respectively.5) Both R_H and R_L are benefit accruing to the bank management and assumed R_H is smaller than R_L (i.e., $R_H < R_L$). Thus, we are assuming the low level monitoring by the authority gives higher benefit to bank management associated with risky bank management.6)

The benefit for the authority is assumed to be dependent on strength of monitoring. It should be noted this benefit is specific to the authority and different from the payoff for depositors (or taxpayers in general) who delegate monitoring bank management to the authority. The levels of benefit the authority obtains from high

level and low level of monitoring are presented respectively by W_H and W_L. Since the authority recognizes its own responsibility for keeping prudent bank management, we may assume $W_H > W_L$. When the bank accepts *amakudari*, the benefit C is transferred from the bank to the authority. Table 1 summarizes a pay-off matrix for a stage game.

The Nash equilibrium for the stage game is trivially a combination of strategy of (N, H). That is, the authority engages in high level monitoring, and the bank rejects *amakudari* officials from the authority. However, in the repeated game between the authority and the bank, the strategy combination of (A, L) will be realized.

Assume the following conditions:

$$R_L - C > R_H \tag{1}$$

and,

$$W_L + C > W_H. \tag{2}$$

The inequality (1) implies the pay-off for the bank is larger when it accepts *amakudari* and enjoys lower level monitoring by the authority than when it rejects *amakudari* and is stringently monitored. The second condition (2) means the authority will obtain higher pay-off when it chooses low level monitoring keeping *amakudari* positions in the bank than when it chooses high level monitoring but loses an *amakudari* position. Following the Folk Theorem, these conditions accompanied with a specific condition with respect to a discount rate factor ensure a Nash equilibrium in the repeated game characterized by the strategy combination (A, L). The condition concerning the discount rate factor r necessary and sufficient for the Nash equilibrium is as follows:

$$r < \min[\ (R_L - R_H)/C,\ C/(W_H - W_L)\ ] \tag{3}$$

The inequality (3) implies that the present value of pay-off obtained by repeating the strategy (A, L) is larger than that obtained when deviating from this strategy.7)

The model predicts what kind of banks are unwilling to accept *amakudari* officials from the authority. Consider the bank are so risk averse that its benefit R_L under the low level monitoring is almost equal to R_H. In this case, the term $(R_L - R_H)/C$ is extremely low, and the inequality (3) necessary and sufficient for the self-enforcing equilibrium of the *amakudari* relationship would hardly hold. Alternatively, if the net

benefit of the regulator from the stringent monitoring (H) is extremely high compared to the compensation C from the *amakudari*, it would be difficult for the Nash equilibrium of (A, L) to be realized.

It should be noted that the strategy (A, L) of the repeated game is superior to the strategy (N, H) of the stage game in terms of Pareto. We can make sure this by comparing the total pay-off obtained by the authority and the bank between the H strategy and the L strategy. From inequality (1) and (2), the following inequality is derived;

$$R_L+W_L > R_H+W_H \qquad (4)$$

Thus, the self-enforcing repeated game through *amakudari* helps both the authority and the bank to choose the Pareto improving strategy.

However, this does not necessarily mean that this self-enforcing game contributes to enhancing social welfare, because it neglects the welfare of the depositors/taxpayers, a principal for the authority. If the risky bank management promoted by the low level monitoring (the L strategy) greatly decreases the economic welfare of the depositors/taxpayers in general, it is likely that the total social welfare is lower in the case of self-enforcing *amakudari* game than otherwise.

Some refutable hypotheses

Our model of self-enforcing mechanism derives some refutable hypotheses concerning influence of *amakudari* on monitoring by the regulator. The following three propositions are straightforwardly derived from what we discussed above:

Hypothesis 1: The degree of risk taken by banks accepting *amakudari* official is higher than the risk taken by the bank accepting no *amakudari* officials.

Hypothesis 2: There is continuity of the *amakudari* relationship between the authority and individual banks.

Hypothesis 3: The *amakudari* from the BOJ is less influential to prudence of bank management than that from the MOF.

Hypothesis 1 means that the *amakudari* system undermines the effectiveness of monitoring in the sense that the regulator chooses lower level of monitoring if the

bank accepts *amakudari* officers. In other words, some banks and the regulator strategically use the acceptance of *amakudari* and lower level of monitoring to benefit each other. Hypothesis 2 states the feature of continuity of *amakudari* relationship is crucial in our repeated game. The punishment strategies presumed in Hypothesis 1 would not work if the regulator and the bank play the one shot game. Thus in the framework of one-shot game the past decision concerning *amakudari* acceptance would not affect the current decision whether or not to accept *amakudari*.

Our model predicts that the *amakudari* would undermine effectiveness of monitoring by the authority because monitoring is abused to realize the self-enforcing long-term relationship between the regulatory authority and banks. In other words, the equilibrium accompanied with low level monitoring would not realize in our model unless the regulator owns real administrative power. The *amakudari* from the authorities without significant responsibility of monitoring would not influence soundness of bank management. This result is interesting because Japanese banks accept *amakudari* officials not only from the MOF responsible for monitoring and disciplining banks, but also from the BOJ that is not a so significant regulator as the MOF.8) Hypothesis 3 states this point.

Some reservations

Before proceeding to statistical tests of the refutable hypotheses, we need to express some reservations about the theoretical model.

First, we assume the authorities could manipulate the effective level of monitoring against the interests of depositors/taxpayers who delegate the role of disciplining bank management to them. Put it in another way, the taxpayers are assumed to be unable to observe how the authorities are implementing monitoring. If we could make the procedure of monitoring by the authorities transparent, it would be difficult for the authorities to arbitrarily manipulate monitoring. Then, our argument concerning self-enforcing relationships between bank and the regulator would not hold.

Second, the extreme risk-taking by banks would decrease benefit for the

regulatory authority, because it would be likely to lead to bank failures that either discredit the regulator with taxpayers or decrease the job opportunity for retired officials. Thus, provided the possibility of bank failure is regarded as high, the authority would have incentives to suppress bank risk-taking by strengthening monitoring. However, our model neglects the possibility of bank failures. Our argument would be applicable to the situation where the regulator is not sincerely concerned with bank failure. In other words, our model tells a story how the *amakudari* relationship undermines stability of the banking system when there is no great danger of bank failure. Actually, this situation is what we experienced until the beginning of the 1990s in Japan.

Third, the regulator could use other variables as the punishment device instead of manipulating monitoring strength. As long as the regulatory variables are controllable for the regulator at discretion, they would be used as a punishment device. For example, the MOF determined the number and location of branches for individual banks under the branch-administration. Under the regulation of deposit interest rates, branches were important as a means of expanding the scale of bank business. Thus, the bank accepting *amakudari* officials from the MOF may expect to be given favorable treatment by the MOF in the process of executing the branch-restricting regulation. However, as our primitive analysis will show in the next section, there exists no significant influence of the *amakudari* relationship on the growth rate in the number of banks. We will not pursue this alternative story hereafter.

Lastly, we explain the implications of our model by contrast to the positive evaluation provided by AP&S about the *amakudari* mechanism in the Japanese financial system. Although explicitly recognizing the danger of a moral hazard problem associated with the *amakudari* relationship between bureaucrats and private banks, they insist that the danger is prevented from realizing "by minimizing individuals' discretion in arranging post-retirement jobs." They argue "the job is arranged by the Personnel Division of the MOF (or the BOJ), not by the individual concerned.・・・・Thus the incentive for individual bureaucrats to develop ties with

particular institutions during their bureaucratic tenure is curbed (pp.32-33)." In our model, however, the fact that the *amakudari* relationship is arranged not by individual bureaucrats but by the bureaucracy provides the basis for a repeated game transaction between the bureaucracy and banks. If an individual bureaucrat is assumed to arrange the post-retirement job, the game would not be a repeated one. If so, we would not be able to explain the self-enforcing equilibrium of *amakudari* cum soft monitoring.

Our model would tell a story quite different from the one with inefficient monitoring if we alter some assumptions. For example, let assume that the banks accepting officials from the regulatory authorities could increase profits and could transfer some of the profits to the bureaucrats as compensation, and that the regulator is motivated to stringently monitor bank management. Then our model would produce the equilibrium of *amakudari* cum effective monitoring just as AP&S argue. In this equilibrium, the *amakudari* relationship would influence bank performance positively rather than negatively. However, this is obviously inconsistent with what we will show in the following discussion.

III The *Amakudari* System in the Japanese Banking Industry

This section explains a few features of the *amakudari* system in the Japanese banking system. In particular, the continuity of *amakudari* relationships between specific banks and the monetary authorities and the negative correlation between *amakudari* and bank performances are pointed out in this section.

Characteristics of the *amakudari* system

The reemployment of government bureaucrats by private businesses after their retirement is prevalent in Japan. This practice is regulated by the National Public Service Law (Kokka Komuin Ho). According to this law, government employees are not allowed to join a private company for two years after their retirement if they had a close connection with the company within the five years prior to retirement. Every public servant must obtain approval from the National Personnel Authority (Jinji In) if she wants to be employed by a private company before the end of the two-year "cooling period."9)

Following this rule, both the MOF and the BOJ send a number of their post-retirement officials to the managerial board of private banks and deposit-taking financial institutions. As is well known, the distribution of retired officials tends to be concentrated in small and medium size banks. While many regional banks and most smaller banks such as shinkin and cooperative credit banks have accepted officials for a long time, large city banks have traditionally been independent of the *amakudari* system.10) Table 2 shows the number of executive officials who "descended" from the monetary authorities to the regional banks' managerial boards. The sample consists of 125 regional banks existing as of March 1996.11) According to this table, nearly 200 former high-ranking bureaucrats occupied important positions in private banks' executive boards. Table 3 shows the positions of *amakudari* officers as of June 1990. The distribution of positions did not greatly change during the period from the late 1970s to the early 1990s.

We classify the sampled 125 regional banks into four categories according to

whether or not they accept *amakudari* officers (their *amakudari* status). The first group (category MOF&BOJ) contains the banks which accept *amakudari* officers from both the MOF and the BOJ. The second one (category MOF) consists of the banks accepting officers only from the MOF. The third one (category BOJ) is the group of banks accepting *amakudari* only from the BOJ. Finally, the fourth one (category NON) consists of the banks that do not accept *amakudari* officers at all. The right hand side of Table 2 presents the distribution of banks according to this classification. The table suggests that the *amakudari* officers from the MOF (i.e., categories MOF&BOJ and MOF) constitute a core of the regional banks' managerial board. Although some banks (category NON) have remained independent from the *amakudari* system, the number of those banks is at most one fifth of the total number. Thus, the *amakudari* system has been very prevalent in the Japanese banking industry.

It is noteworthy that the *amakudari* status of the sample banks rarely changes over time. We calculated the probability of a bank's transition from one category to another over a year during the sample period from 1977 to 1989. Panel A of Table 4 presents the averages of the transition probability. In this table, figures in the diagonal are overwhelmingly greater than the off-diagonal figures, suggesting that most banks tended to stay in a specific category (*amakudari* status) for a long time. In panel B of Table 4, we calculated the same transition probability comparing the *amakudari* status of 1989 with that of 1980. Panel B shows that the figures in the diagonal are still significantly higher than the off-diagonal figures. Although the time span is much longer in panel B than in panel A, the probability of transition from one status to another is much smaller than could be expected from the probability of annual transition presented in panel A in Table 4. Thus, many Japanese banks have maintained stable human relationships with the monetary authorities through the *amakudari* system (Hypothesis 2).

Performances of banks accepting *amakudari* officials

This section looks at the statistical relationships between *amakudari* status and bank performances. Table 5 compares some performances of the five year average

depending on the *amakudari* status as of the beginning of each period. For example, Panel A subdivides the sample banks into the four categories MOF&BOJ, MOF, BOJ and NON as of 1980, and then compares performance averages (i.e., capital/asset ratio EQT, the annual growth rate in the number of branches BRN, the annual growth of total assets GAS, and the current profits per equity capital PRO) during the first half of the 1980s (1980-1984) of each category. Panel B and C are those of the latter half of the 1980s (1985-89) and the first half of the 1990s (1990-94) respectively.

In all of the three panels A, B, and C, the capital/asset ratio (EQT) is significantly lower for both categories MOF&BOJ and MOF than for category NON. For example, during the first half of the 1980s, the capital/asset ratio (EQT) for category MOF&BOJ banks, which accepted *amakudari* officials from both the MOF and BOJ as of 1980, was on average 0.927 per cent point lower than that of category NON banks. The differences are statistically significant at the 1 per cent level. As Keely(1990) argues, the lower level of capital/asset ratio implies the higher level of risk. As for asset growth (GAS) and profitability (PRO), we find no significant difference between the banks belonging to either category MOF&BOJ or MOF, and the banks of category NON. Thus, Table 5 suggests that the banks accepting *amakudari* officials from the MOF tend to take higher level of risk. This result is consistent with Hypothesis 1 in the previous section.

The performances of the banks belonging to category BOJ (i.e., the banks accepting *amakudari* officials only from the BOJ) are similar to those of category NON banks for all the sample periods except for EQT in panel C. Since the BOJ does not play a significant role with respect to prudential regulation, this result is consistent with Hypothesis 3 predicting that the *amakudari* from the authorities which have no significant regulatory power does not influence bank performance.

Bad loans and *amakudari*

As has been explained, the equity/asset ratio (EQT) is a conventional measure of risk taken by a bank. However, the bad loan ratio (i.e., the amount of non-performing loans per total loan) may be an effective alternative to EQT. While

the former is an ex-ante measure of bank risk, the latter is an ex post measure in the sense that the more aggressive a bank takes risk, the larger amount of non-performing loans will be incurred. The Japanese banks started to disclose comprehensively the amount of non-performing loans they held for the first time in March 1996.12) We may interpret the figures of non-performing loans as of March 1996 indicates the degree of risk the banks took during the latter half of the 1980s and the early 1990s.

The rows of BAD in Panel B and C of Table 5 present the bad loan ratio for each category of *amakudari* status. For example, Panel B shows the two groups of banks accepting *amakudari* officials from the MOF (i.e., MOF&BOJ and MOF) as of 1985 had almost twice higher bad loan ratio (4.145) than the bank totally independent from the *amakudari* relationship (i.e., NON). These differences are statistically significant at the 1% level. In contrast, the average level of bad loan ratio for the banks accepting *amakudari* from the BOJ (i.e., BOJ) is not significantly different from that of the NON. The same is true of Panel C which classifies sample banks according to their *amakudari* status as of 1990. Thus, if we measure (ex post) risk by the bad loan ratio, the results are consistent with our hypothesis that the *amakudari* relationship undermines monitoring by the MOF.

What about the branch administration?

In the previous section, we mentioned that the MOF may have implemented the branch administration regulations in favor of the banks accepting *amakudari* officials from the MOF and against those accepting no retirees from the MOF. The favorable treatment concerning branch administration might have given private banks incentives to accept *amakudari* as an instrument of compensating the MOF. The variable BRN in Table 5 is the average growth rate of branches during the respective periods. Contrary to our conjecture, according to this table, there are no significant differences between the banks accepting *amakudari* from the MOF (category MOF&BOJ and MOF) and others with respect to BRN. Thus, the MOF does not seem to have carried out branch administration in order to systematically support the *amakudari* system.

Ⅳ Empirical Tests of the Hypotheses

The descriptive statistics in Table 5 seems to support our hypothesis that the *amakudari* relationship leads to unsound bank management by undermining effectiveness of monitoring by the MOF. In this section we test the hypotheses by econometric methods. First, we test whether or not the *amakudari* relationship deteriorates bank performance, particularly the soundness of banks, by making use of cross sectional regressions. As has already been mentioned in Table 4, there exists significant continuity in the *amakudari* relationship. Thus, it would not make sense to analyze the influence of *amakudari* by the annual base. We estimate the cross-sectional regression equation, instead of panel estimation. As is same as in the previous section, the sample period is divided into three periods. After averaging the panel data across time in each period, we estimate the cross-sectional regression for each period.

Second, we test the Hypothesis 2 in Section Ⅱ which stresses continuity of the *amakudari* relationship by a probit method. We are interested in to what extent the *amakudari* status in the past determines the current status of an individual bank.

Incidentally, we mainly consider the *amakudari* from the MOF; i.e., whether or not the bank belonged to category MOF&BOJ or MOF according to the classification explained in the previous section. We concentrate our attention on the *amakudari* from the MOF because the observation in the previous section suggested the *amakuduari* from the MOF is important for bank performances, whereas *amakudari* from the BOJ seems insignificant. However, we also investigate influence of *amakudari* from the BOJ briefly by a simple method at the end of this section.

The effect of *amakudari* on the capital/asset ratio

To begin with, we investigate how the *amakudari* affects the bank risk embodied by capital/asset ratio. Basically, we estimate the following regression equation

$$EQT_i(t) = a + bX_i(t-1) + e_i, \qquad \text{for } i=1, \cdots, N, \qquad (5)$$

where N is the number of observations. The dependent variable $EQT_i(t)$ is the current capital/asset ratio of bank i at time t. $X_i(t-1)$ is an independent variable vector consisting of three variables: the capital/asset ratio at t-1 ($EQT_i(t-1)$), the growth rate

of total asset at t-1 ($GA_i(t-1)$), and the current profit rate at t-1($PRO_i(t-1)$). a is a constant term and b is a coefficient vector. e_i is a standard normal random variable with variance s^2. We test whether or not there is a structural difference in equation (5) depending on the *amakudari* status. In general, the unrestricted regression equation is written as follows;

$$EQT_i(t) = a_A + b_A X_i(t-1) + e_{Ai} \qquad \text{for i such that } AMi(t)=1 \qquad (5.A)$$

$$EQT_i(t) = a_N + b_N X_i(t-1) + e_{Ni} \qquad \text{for i such that } AMi(t)=0 \qquad (5.N)$$

where subscript A and N denotes the acceptance and not-acceptance of *amakudari*, respectively. Hypothesis 1 predicts that at least one coefficient including the constant term is smaller in equation (5.A) than in (5.N). Table 6 reports the results of estimation of (5.A) (the upper panel) and (5.N) (the lower panel). The coefficients of EQT(t-1) are significantly positive in all of the estimation and that of (5.A) seems smaller than of (5.N) for both period 80-84 and 85-89. However, as for period 90-94, the coefficient of EQT(t-1) seems larger in (5.A) than in (5.N). As for period 80-84, the coefficient of PRO(t-1) is significantly positive only in equation (5.N). As for period 85-89, the coefficient of GAS(t-1) is significantly negative only in (5.N) while those of PRO(t-1) are significantly positive and that of (5.A) seems smaller than of (5.N). As for period 90-94, constant term and the coefficient of GAS(t-1) are significantly positive in both equations. Table 7 reports the results of hypothesis test on the equality of coefficients.

It is well known that the test of structural differences (the Chow test) requires the equality of variance s^2_A and s^2_N. To test this, we execute the preliminary test of the null hypothesis $s^2_A = s^2_N$. Table 7 consists of three parts, each of which shows the test results for each of three sample periods. The first rows of each part shows the result of the test of equality of variances. As for sample period 80-84, the null hypothesis cannot be rejected even at the 90% significance level so that we can test the hypotheses on the equality of coefficients using usual F test. However, for sample periods 85-89 and 90-94, the null hypothesis is rejected at 1% and 5% significance level so that we must test the hypotheses on the equality of coefficients using the Wald test. In each panel, next to the preliminary test, we test the null hypothesis that all the coefficients (including constant term) are equal. The test is rejected in period 80-84 and 85-89 while it is accepted in period 90-94. As for the period 80-84, equality test of the coefficient of EQT(t-1) is rejected at 10%

significance level. The difference of coefficient of EQT(t-1) is -0.312 (0.556-0.868). Thus, at least for period 1980-1984, the *amakudari* reduces the capital/asset ratio (increases the ex ante risk taken by banks). For the sample period 85-89, equality test based on the Wald criterion is rejected as for EQT(t-1) and accepted as for PRO(t-1). The difference of coefficient of EQT(t-1) is -0.557 (=0.629-1.186). Thus, the estimation results for both periods 80-84 and 85-89 support the Hypothesis 1 that the *amakudari* relationship hinders the effective monitoring by the MOF.

However, the result for period 90-94 provides us with a different picture from the former results. We cannot discern significant differences regarding the capital/asset ratio between regime (5.A) and (5.N) as reported also in Table 7. This is the sharp contrast with the results of other two periods. It is also different from what the statistics in Panel C of Table 5 show to us. We interpret this result as follows. Since the late 1980s when the BIS capital adequacy rule was introduced the MOF has been forced to strengthen the prudential regulation. In addition, as the bad loans problem has become more and more serious, the MOF belatedly recognized importance of monitoring bank management. The rightest column in Table 6 shows that this policy change has been effective in mitigating the bad influence of *amakudari* relationship on the soundness of bank management.

The effect of *amakudari* on the bad loan

As has been explained in the previous section, the bad loan ratio is an ex post measure of bank risk. In this subsection, we analyze the influence of *amakudari* on risk-taking by banks in terms of the bad loan ratio. Corresponding to equation (5.J) (J=A, N) the estimated (unrestricted) regression equations are,

$$\mathrm{Log}(BAD_i) = a_A + b_A X_{Ai}(t\text{-}1) + e_{Ai} \qquad (6.A)$$

$$\mathrm{Log}(BAD_i) = a_N + b_N X_{Ni}(t\text{-}1) + e_{Ni}, \qquad (6.N)$$

where the dependent variable is a logarithm of bad loan ratio as of March 1996.13) $X_{Ji}(t)$ is a vector of independent variables of the sample period 1990-1994. The cross term between EQT, GAS and PRO are added to $X_{Ji}(t)$.

Table 8 presents the results of estimation and the hypothesis test. In equation (6.A), the constant term and the coefficient of cross term (EQT・GAS) are significantly positive and the coefficient of (EQT・PRO) is significantly negative. In equation (6.N), GAS(t-1) has the significantly negative effect on the Log(BAD) and

(EQT・GAS) has the significantly positive effect. The preliminary test of the equality of variances are accepted even at the 85% significance level. Then, the null hypothesis that the all the coefficients(including constant term) are the same is rejected in the F test at 1% level. In upper panel, the constant term seems larger in (6.A) than in (6.N), implying that the *amakudari* increases bad loan ratio. The null hypothesis that the constant term is the same is rejected at 1% significance level. As for other three independent variables whose coefficients are significant (GAS, (EQT・GAS), (EQT・PRO)), the difference cannot be discerned. Thus Hypothesis 1 is supported even when the bank risk is measured ex post by the bad loan ratio. We conclude that the *amakudari* relationship undermined the effectiveness of monitoring by the MOF leading to the fragile banking industry in Japan.

What determines the *amakudari* status of individual banks?

In this subsection, we analyze what determines the *amakudari* status of individual banks. In particular, we are interested in the effect of *amakudari* status in the past on the current status. Hypothesis 2 predicts that the past *amakudari* status has a positive effect on the current status. To address this issue, we estimate the following probit equation;

$$W_i(t)=C + PX_i(t-1) + gAM_i(t-1) + u_i \qquad \text{for } i=1, \cdots, N. \tag{7}$$

$$AM_i(t)=1 \quad \text{if } W_i(t)>0$$
$$AM_i(t)=0 \quad \text{otherwise} \tag{8}$$

We presume in equations (7) and (8) that, at the beginning of period t, an individual bank i decides whether or not to accept *amakudari* officials from the MOF depending on the net expected utility $W_i(t)$ which the bank will obtain if it accepts *amakudari* officials. The net utility is determined by the past bank performances vector $X_i(t-1)=[EQT_i(t-1), GAS_i(t-1), PRO_i(t-1)]$ and the *amakudari* status in the previous period $AM_i(t-1)$. $AM_i(t)$ and $AM_i(t-1)$ are the dummy variables which takes 1 if bank i accepts *amakudari* and takes 0 otherwise, at time t and t-1, respectively. C is a constant term, P is a 1×3 coefficient vector and g is a scalar coefficient. u_i is the standard normal error term whose mean is 0 and the variance is normalized to 1 for a technical reason. Equation (7) is the decision function for the bank i in that the bank decides whether or not to accept *amakudari* based on this equation. The bank accepts

amakudari if $W_i(t)>0$ and rejects it otherwise. Needless to say, $W_i(t)$ is an unobservable utility index. Instead, we observe the *amakudari* status $AM_i(t)$ at the beginning of period t.14) Together with the normality assumption of the error term, the decision function (7) is estimated as a probit equation, which can be estimated by the maximum likelihood method. Estimating equation (7), we can find which variable among the performances and the *amakudari* status in the past affects banks' decision whether or not to accept *amakudari* officials in the current period.

According to Hypothesis 2 in the previous section, the banks having long-term relation with regulators (i.e., those with $AM_i(t-1)=1$) is strategically using *amakudari* in order to benefit the regulators. They are unable to reject *amakudari* because it would incur punishment by the regulators on themselves. Thus , the coefficient of $AM_i(t-1)$ in equation (7), is predicted to be positive. In Table 9 we present the estimation result of probit equation (7) for each sample period. In the first column, AM(t-1) is as of 1977, AM(t) is as of 1980, and Y(t-1) is the average of the period 1975-1979.15) In the second column, AM(t-1) is as of 1980, AM(t) is as of 1985, and Y(t-1) is the average of the period 1980-1984. In the last column, AM(t-1) is as of 1985, AM(t) is as of 1990, and Y(t-1) is the average of the period 1985-1989.

Both the fraction of correct prediction and R-squared are high (around 90% and 60% respectively) in all the columns. The *amakudari* status in the previous period $AM_i(t-1)$ is predominantly important for explaining the current *amakudari* status. The coefficient of $AM_i(t-1)$ is positive and the null hypothesis that . is equal to zero is rejected at the 1% significance level. A marginal increase in $AM_i(t-1)$ increases the probability of accepting *amakudari* by 35.3% in 1980, 42.6% in 1985, and 41.1% in 1990. Thus, the continuity of the *amakudari* status observed in Table 4 is still found even when controlling other variables. This result is consistent with Hypothesis 2.

Among variables other than AM(t-1), the capital/asset ratio EQT(t-1) in the previous period negatively affects the *amakudari* status in both the first and the third columns. A decrease in EQT(t-1) by 1% increases the probability of accepting *amakudari* by around 8% and 7% respectively. These results imply the banks that experienced a decrease in the capital/asset ratio in the previous period are slightly more likely to accept *amakudari* than other banks. If the banks with lower EQT(t-1) are more likely to belong to the group of *amakudari* accepting (AM(t-1)=1) than those with higher EQT(t-1), there would be a problem of multicollinearity. However,

the correlation between EQT(t-1) and AM(t-1) is around -0.3 or -0.4. Thus, the danger of multicollinearity is not serious. Presumably, among the banks with AMi(t-1), those with lower EQT(t-1) is more likely to accept *amakudari*.

Before concluding our empirical analysis, we must take care of self selectivity bias which may distort the results we obtained above. Specifically, there may exist simultaneity between banks' decision making with respect to accepting amakudari (represented by the probit equation (7)) and their performance determined by equations (5.J) (J=A, N). For some reason other than those which are explained by independent variables included in the estimation, some banks may accept *amakudari* and take higher risk at the same time. If so, the OLS estimation summarized in Table 6 would be contaminated by the selectivity bias and be misleading. In order to understand how serious the selectivity bias is in our estimation, we test it in the appendix. The results tell us that there are not significant selectivity biases in any sample periods in Table 6. Thus, we can conclude that the financial authority (MOF) and banks have had long-term relationship and have benefited each other by softening monitoring and accepting *amakudari*, which has led to fragile banking system as our theoretical model predicts.

Amakudari from the BOJ

As is shown in Table 5, the *amakudari* from the BOJ seems to have no significant effect on the bank performance. In this subsection, we confirm Hypothesis 3 by estimating the regression equation. Although it is considered the best to estimate the regression equation distinguishing each category of *amakudari* (MOF&BOJ, MOF, BOJ, and NON), they are correlated so closely that we can not obtain meaningful results from that method. For this reason, we select the banks which belong to category BOJ and NON to estimate the following regression equation;

$$EQT_i(t) = a + bX_i(t-1) + BOJ_i(t) + e_i \qquad (9)$$

$$Log(BAD_i) = a + bX_i(t-1) + BOJ_i(t) + e_i\,, \qquad (10)$$

where BOJi(t) is the dummy variable which takes 1 if the bank i accepts the *amakudari* from BOJ and takes 0 if it does not. The estimated results are reported in Table 10. This table shows even if we control the other economically meaningful variables, the result is the same as the descriptive statistics in Table 5. The coefficients of dummy variable BOJ(t) are not significant except for the third column

(period 90-94). It is significantly negative in the third column as in descriptive statistics. Apart from this period, Hypothesis 3 in Section II is rejected.

This result is consistent with our model, because the BOJ is regarded as playing no significant role of monitor in terms of prudential management. Then why does a bank accept *amakudari* officials from the BOJ? The BOJ could give benefits to private banks through its loans supplied at the rediscount rate usually substantially lower than the interbank money market rates. The ceiling the BOJ used to impose on growth rate in loan supply by each bank (called the "window guidance") might be an important reason why banks accepted *amakudari* from the BOJ. Thus, the specific ways of the monetary control would be a bargaining instrument for the BOJ to motivate banks to accept its retirees. However, this topic is beyond the scope of this paper.

V Concluding Remarks

This paper examined the *amakudari* relationship between the regulatory authorities and private banks. We proposed a simple repeated game model to explain this relationship. The model showed that the regulator tends to take the strategy of "soft" monitoring when the banks accept *amakudari* officials from it. Thus, the *amakudari* relationship undermines the effectiveness of the regulators' supervision of bank management thereby leading to the fragile banking system. In other words, the *amakudari* system poses an agency problem with regard to the prudential regulation in Japan.

Both a descriptive and an econometric analyses supported the results derived from our model. We found the *amakudari* relationship is continuous and the banks accepting *amakudari* officials from the MOF have significantly lower capital/asset ratio and significantly higher bad loan ratio.

What policy implications can we derive from our analysis? We may argue for prohibition of *amakudari* from the regulatory authorities to private banks. However, in practice, it may be difficult to wipe out the traditional flow of human resources between bureaucracies and the private sectors. It may also be counterproductive for the Japanese economy because it would hinder flexible reallocation of human resources. Thus, we think it rather practical to make the discretionary power of the regulatory authorities more limited by explicitly specifying monitoring procedures taken by them. To specify the monitoring procedures will make the administration more transparent and make it difficult for the authorities to abuse their administrative power at the expense of taxpayers. Even after restricting the discretionary power of the regulators, the *amakudari* to private banks would continue. But it would be the market-based transaction without undermining the effective prudential regulation.

Appendix: The self-selection approach

The self-selection model is a simultaneous equation system which takes into account the selectivity bias. Define the covariance matrix of equations (5.J) and (7) as

$$\begin{vmatrix} \sigma_A^2 & 0 & \sigma_{Au} \\ 0 & \sigma_N^2 & 0 \\ 0 & \sigma_{Nu} & 1 \end{vmatrix}$$

The estimation in the text implicitly assumes that $\sigma_{Au} = \sigma_{Nu} = 0$. Otherwise, the conditional expectation of the stochastic term is not guranteed to be zero. According to Heckman's two step method (see Maddala(1983) and Greene(1993)), the equation (5.J) is corrected as follows;

$$EQT_i(t) = a_A + b_A X_{Ai}(t-1) - \sigma_{Au}\lambda_i + e_{Ai}, \qquad (11.A)$$

$$EQT_i(t) = a_N + b_N X_{Ni}(t-1) + \sigma_{Nu}\lambda_i + e_{Ni}, \qquad (11.N)$$

where λ_i is an inverse Mills ratio defined as

$$\lambda_i = \begin{cases} f(W_i(t)^*)/F(W_i(t)^*) & \text{for } AM_i(t)=1, \\ f(W_i(t)^*)/[1-F(W_i(t)^*] & \text{for } AM_i(t)=0. \end{cases} \qquad (12)$$

f and F are density and distribution function of standard normal. $W_i(t)^*$ is a predicted value of probit equation (7). Thus, equation (11.J) can be estimated by OLS method. The estimated coefficient of l_i in equation (11.A) (σ_{Au}) is positive and that of (11.N) (σ_{Nu}) is positive or negative. The t-statistics of the null hypothesis that σ_{Au} or σ_{Nu} is zero are sufficiently smaller than 1 (except for σ_{Nu} of period 90-94) so that the null hypothesis are not rejected at all. Therefore, as has been analyzed in the text, the problem of selectivity bias is not serious. In addition, the estimated coefficients of other independent variables are almost the same as those of Table 6.

Endnotes

1) See, for example, Aoki(1994). Sharpe(1990) and Rajan(1992) provide theoretical models to explain monitoring by private banks. Their argument shows the existence of costs associated with bank monitoring when a specific bank monopolizes information about its borrowers.

2) See also Aoki(1994).

3) Kane(1989) points out executive officers are paid lower wages than the market value of their services during their careers as public servants and are compensated by post-retirement jobs. He argues this compensation system induces regulators to allow insolvent zombie institutions to continue in operation gambling that they can complete a creditable period of government services and make a "clean getaway" to a better job before the problem deteriorates into a public scandal. We take up a similar conflict of interests situation in this paper by explicitly considering why the regulator should be compensated by the post-retirement jobs. This issue is not analyzed by Kane(1989).

4) Kanemoto(1996) discusses the *amakudari* in general as a sort of self-enforcing mechanism between private businesses and public authorities in a different context.

5) Such characterization of monitoring is found in several papers. For example, see Boot and Greenbaum(1993).

6) The flat-rate premium of deposit insurance strongly induces banks to take greater risk. See Merton(1977).

7) We assume both the authority and the bank adopt a trigger strategy in that the bank takes the A strategy at the t-th period if the authority continues the L strategy until the previous period t-1 and otherwise takes the N strategy, and similarly the authority takes the L strategy if the bank continues to accept *amakudari* (the A strategy) until the previous period and otherwise takes the H strategy.

8) We are arguing the BOJ is less powerful than the MOF with regard to the prudential regulation. However, the BOJ is apparently influential to banks' behavior in the money markets and to their liquidity positions. Thus, the amakudari from the BOJ may influence on those aspects of bank management which are not directly related to the solvency issue we are focusing on.

9) As for a concise explanation of *amakudari* practice, see Blumenthal(1985).

10) Calder(1989) argues for small-scale or regional banks the *amakudari* system is a measure to obtain relevant information regarding policy and administration implemented by the authorities. On the other hand, as of 1985, there were no officials from the monetary authorities on the managerial board of eight city banks, Dai-ichi Kangyo, Mitsui, Mitsubishi, Fuji, Sumitomo, Sanwa, Daiwa, and Saitama. See also Rixtel(1994).

11) The sample in this paper consists of regional banks excluding other banks. In the context of the *amakudari* system, the group of city banks is unimportant because of their independence from the system. On the other hand, smaller banks such as cooperative banks are important. However, because there is limited data availability (particularly, bad loan data), we are forced to exclude them from our sample. Incidentally, the total asset of the regional banks was ¥195.2 trillion accounting for 25.8% of the total assets of the domestically licensed banks as of the end of 1996.

12) The major 21 banks (11 city banks, 7 trust banks, and 3 long-term credit banks) and the regional banks began to partially disclose non-performing loans in March 1993. But the disclosed non-performing loans were far from comprehensive.

13) Since the distribution of individual banks' bad loan ratio has a skew shape, we take logarithm of bad loan ratios (Log(BADi)) as a dependent variable.

14) One may wonder if the number of the *amakudari* officials in a bank may be included in the unobservable utility index Wi(t). However, the preliminary analysis not reported here tells us that the number of *amakudari* officials does not affect the bank performance.

15) Since the data of *amakudari* status for individual banks is not available before 1977, we define the *amakudari* status of 1977 as AMi(t-1) in the first column.

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Table 1: The Pay-Off Matrix for the Stage Game

G / B	H	L
A	R_H-C, W_H+C	R_L-C, W_L+C
N	R_H, W_H	R_L, W_L

Table 2: The number of *amakudari* officials and banks:
From the MOF and the BOJ to the regional banks

Fiscal year	The number of *amakudari* officials			The number of banks			
	From the MOF	From the BOJ	Total	Category MOF&BOJ	MOF	BOJ	NON
1977	104	76	180	40	42	20	23
1978	100	76	176	38	42	23	22
1979	104	79	183	41	42	22	20
1980	115	80	195	42	48	19	16
1981	108	80	188	44	42	19	20
1982	112	80	192	46	41	17	21
1983	115	79	194	46	40	17	22
1984	122	79	201	45	42	18	20
1985	121	76	197	41	43	21	20
1986	121	75	196	41	44	21	20
1987	112	76	188	40	40	24	21
1988	114	85	199	45	39	21	20
1989	117	80	197	45	40	20	22
1990	120	80	200	40	43	20	22
1991	110	79	189	39	37	25	24
1992	108	76	184	42	37	22	24

(Note) Figures present the number of *amakudari* executive officials in the 125 regional banks exisiting at March 1996.

Table 3: Positions of amakudari officials in the regional banks as of June 1990

Positions	The number of officials
Chairman (*Kaicho*)	27
Vice-chairman (*Fuku-kaicho*)	1
President (*Todori* or *Shacho*)	31
Vice-predident (*Fuku-todori*)	8
Executive director (*Senmu*)	22
Managing director (*Jyomu*)	48
Directors (*Torishimari-yaku*)	40
Auditor (*Kansa-yaku*)	23
Total	200

(Source) Keizai Chosa Kyokai

Table 4(A): Probabilty of annual transition from category K(t) to J(t+1)
Average from 1977 to 1989; K, J=MOF&BOJ, MOF, BOJ, NON

t year \ t+1 year		J(t+1)			
		MOF&BOJ	MOF	BOJ	NON
K(t)	MOF&BOJ	0.931	0.031	0.037	0.000
	MOF	0.036	0.937	0.008	0.020
	BOJ	0.091	0.004	0.884	0.021
	NON	0.000	0.049	0.016	0.934

Table 4(B): Probabilty of transition from category K(1980) to J(1989)
K, J=MOF&BOJ, MOF, BOJ, NON

1980 \ 1989		J(1989)			
		MOF&BOJ	MOF	BOJ	NON
K(1980)	MOF&BOJ	0.762	0.119	0.095	0.024
	MOF	0.146	0.729	0.021	0.104
	BOJ	0.211	0.000	0.737	0.053
	NON	0.000	0.000	0.063	0.938

Table 5: *Amakudari* and performance pf regional banks

Panel A: Period 1980-1984

	MOF&BOJ	MOF	BOJ	NON
EQT	2.648***	2.739***	3.484	3.575
BRN	3.388	3.325	3.047	3.006
GAS	8.736	7.908	7.953	7.984
PRO	8.001	8.096	8.456	7.604

Panel B: Period 1985-1989

	MOF&BOJ	MOF	BOJ	NON
EQT	2.849***	3.008***	3.390	3.411
BRN	2.513	2.430	2.777	2.206
GAS	10.945	9.927	10.526	9.815
PRO	8.913	9.087	8.641	8.610
BAD	4.145***	4.145***	2.205	2.200

Panel C: Period 1990-1994

	MOF&BOJ	MOF	BOJ	NON
EQT	3.427***	3.698**	3.696*	4.046
BRN	1.877	1.853	1.795	1.698
GAS	1.985	2.570	2.359	2.405
PRO	4.054	4.148	4.809	4.950
BAD	4.225***	3.843**	2.761	2.159

(Note) The asterisks *** , **, and * indicate the figures are different from the those of "NON" significantly at 1%, 2.5%, and 5% respectively. Panel A and B delete Daiko Bank because of its abnormal performances during the 1980s, and Panel C deletes Kumamoto Family Bank because of merger with regional financial institutions at the beginning of the 1990s.

Table 6: Estimation Results of Regression Equation
Dependent variable: EQT(t)

Sample period	1980-1984	1985-1989	1990-1994
Regime A(Eq. 5.A)			
Independent Variables			
Constant term	0.832 (0.763)	-0.101 (0.288)	2.105 (6.731)***
EQT(t-1)	0.556 (2.276)**	0.629 (6.761)***	0.319 (3.750)***
GAS(t-1)	-0.011(0.605)	0.017 (0.639)	0.047 (2.702)***
PRO(t-1)	0.026 (0.971)	0.154 (4.858)***	0.006 (0.935)
Mean of dependent var.	2.696	2.981	3.569
Adjusted R-squared	0.561	0.485	0.238
Standard error of regression	0.382	0.488	0.518
Number of Observations	88	83	82
Regime N(Eq. 5.N)			
Independent Variables			
Constant term	-0.883(1.528)	-0.522 (0.357)	1.760 (2.287)**
EQT(t-1)	0.868 (16.383)***	1.186 (4.817)***	0.266 (3.433)***
GAS(t-1)	0.001 (0.062)	-0.270 (2.324)**	0.094 (2.347)**
PRO(t-1)	0.095 (2.894)***	0.277 (2.259)**	0.025 (0.355)
Mean of dependent var.	3.527	3.577	3.879
Adjusted R-squared	0.925	0.352	0.263
Standard error of regression	0.203	1.163	0.665
Number of Observations	36	41	42

(Note) Figures in parentheses are t-statitistics. *, **, and *** indicate that the coefficients are significant at the 10, 5, and 1% level respectively. In each column, EQT(t) is the averages of 1980-1984, 1985-1989, and 1990-1994, respectively. In each column, t-1 denotes 1975-1979, 1980-1984, and 1985-1989, respectively.

Table 7: Estimation Results of Probit Equation
Dependent Variable: AM(t)

Sample Period	1980	1985	1990
Independent Variables			
Constant term	2.219	-0.343	0.257
	(1.140)	(-0.092)	(0.237)
	[0.318]	[-0.061]	[0.049]
EQT(t-1)	-0.552	-0.151	-0.380
	(-2.857)***	(-0.595)	(-1.882)*
	[-0.079]	[-0.027]	[-0.072]
GAS(t-1)	-0.015	0.048	0.023
	(-0.143)	(0.604)	(0.451)
	[-0.002]	[0.009]	[0.004]
PRO(t-1)	-0.074	-0.092	-0.023
	(-0.839)	(-1.075)	(-0.265)
	[-0.011]	[-0.017]	[-0.004]
AM(t-1)	2.468	2.383	2.174
	(6.695)***	(6.287)***	(6.993)***
	[0.353]	[0.426]	[0.411]
Log of Likelihood Function	-30.315	-42.636	-42.903
Number of Observations	124	124	124
Number of Positive Observations	88	83	82
Sum of Squared Residuals	9.101	11.475	12.508
R-Squared	0.644	0.582	0.550
Fraction of Correct Predictions	0.887	0.895	0.871

(Notes) Figures in parentheses are t-statitistics. *, **, and *** indicate that the coefficients are significant at the 10, 5, and 1% level respectively. Figures in square blackets are marginal effect of independent variabl on the probability of accepting amakudari. In the first column, AM(t-1) is as of 1977, AM(t) is as of 1980, and Y(t-1) is the average of the period 1975-1979. In the second column, AM(t-1) is as of 1980, AM(t) is as of 1985, and Y(t-1) is the average of the period 1980-1984. In the last column, AM(t-1) is as of 1985, AM(t) is as of 1990, and Y(t-1) is the average of the period 1985-1989.

Table 8: Estimation Results of Regression Equation
Dependent variable: EQT(t)

Sample period	1980-1984	1985-1989	1990-1994
Regime A(Equation 9.A)			
Independent Variables			
Constant term	0.771 (1.977)**	-0.105 (-0.297)	2.113 (6.570)***
EQT(t-1)	0.566 (10.112)***	0.635 (6.717)***	0.320 (3.722)***
GAS(t-1)	-0.008 (-0.343)	0.015 (0.547)	0.046 (2.592)***
PRO(t-1)	0.027 (1.527)	0.157 (4.809)***	0.006 (0.936)
λ	-0.080 (-0.637)	-0.076 (-0.435)	-0.021 (-0.117)
Mean of dependent var.	2.696	2.981	3.569
Adjusted R-squared	0.557	0.480	0.229
Standard error of regression	0.383	0.491	0.521
Number of Observations	88	83	82
Regime N(Equation 9.N)			
Independent Variables			
Constant term	-0.818 (-1.650)*	-0.806 (-0.495)	2.063 (2.577)***
EQT(t-1)	0.857 (16.097)***	1.273 (3.940)***	0.229 (2.793)***
GAS(t-1)	0.003 (0.013)	-0.287 (-2.308)**	0.081 (1.986)**
PRO(t-1)	0.095 (3.995)***	0.283 (2.266)**	0.035 (0.500)
λ	-0.034 (-0.466)	0.158 (0.420)	-0.235 (-1.262)
Mean of dependent var.	3.527	3.577	3.880
Adjusted R-squared	0.923	0.337	0.274
Standard error of regression	0.206	1.176	0.660
Number of Observations	36	41	42

(Note) Figures in parentheses are t-statitistics. *, **, and *** indicate that the coefficients are significant at the 10, 5, and 1% level respectively. In each column, EQT(t) is the averages of 1980-1984, 1985-1989, and 1990-1994, respectively. In each column, t-1 denotes 1975-1979, 1980-1984, and 1985-1989, respectively.

Table 9: Estimation Results of Probit Equation
Dependent Variable: AM(t)

Sample Period	**1980**	**1985**	**1990**
Independent Variables			
Constant term	2.219	-0.343	0.257
	(1.140)	(-0.092)	(0.237)
	[0.318]	[-0.061]	[0.049]
EQT(t-1)	-0.552	-0.151	-0.380
	(-2.857)***	(-0.595)	(-1.882)*
	[-0.079]	[-0.027]	[-0.072]
GAS(t-1)	-0.015	0.048	0.023
	(-0.143)	(0.604)	(0.451)
	[-0.002]	[0.009]	[0.004]
PRO(t-1)	-0.074	-0.092	-0.023
	(-0.839)	(-1.075)	(-0.265)
	[-0.011]	[-0.017]	[-0.004]
AM(t-1)	2.468	2.383	2.174
	(6.695)***	(6.287)***	(6.993)***
	[0.353]	[0.426]	[0.411]
Log of Likelihood Function	-30.315	-42.636	-42.903
Number of Observations	124	124	124
Number of Positive Observations	88	83	82
Sum of Squared Residuals	9.101	11.475	12.508
R-Squared	0.644	0.582	0.550
Fraction of Correct Predictions	0.887	0.895	0.871

(Notes) Figures in parentheses are t-statitistics. *, **, and *** indicate that the coefficients are significant at the 10, 5, and 1% level respectively. Figures in square blackets are marginal effect of independent variabl on the probability of accepting amakudari. In the first column, AM(t-1) is as of 1977, AM(t) is as of 1980, and Y(t-1) is the average of the period 1975-1979. In the second column, AM(t-1) is as of 1980, AM(t) is as of 1985, and Y(t-1) is the average of the period 1980-1984. In the last column, AM(t-1) is as of 1985, AM(t) is as of 1990, and Y(t-1) is the average of the period 1985-1989.

Table 10: Estimation Results of Regression Equation: Amakudari from BOJ

Sample period	**1980-1984**	**1985-1989**	**1990-1994**	**1990-1994**
Dependent Variable	**EQU(t)**	**EQU(t)**	**EQU(t)**	**LBAD**
Independent Variables				
Constant term	-0.869 (1.367)	-0.472 (0.523)	1.965 (1.435)	1.083 (2.135)**
EQT(t-1)	0.867 (15.401)***	1.193 (3.335)***	0.274 (0.860)	0.021 (0.170)
GAS(t-1)	-0.0004(0.017)	-0.287 (1.100)	0.094 (1.661)	0.028 (0.549)
PRO(t-1)	0.095 (2.982)***	0.262 (1.661)	0.019 (0.332)	-0.118 (1.803)*
BOJ(t)	0.012 (0.143)	0.363 (0.792)	-0.394 (1.849)*	0.180 (1.161)
Mean of dependent var.	3.527	3.577	3.879	0.741
Adjusted R-squared	0.923	0.351	0.316	0.012
Standard error of regression	0.206	1.164	0.641	0.512
Number of Observations	36	41	42	42

(Note) Figures in parentheses are t-statitistics. *, **, and *** indicate that the coefficients are significant at the 10, 5, and 1% level respectively.