THE AUSTRALIAN NATIONAL UNIVERSITY

WORKING PAPERS IN ECONOMICS AND ECONOMETRICS

The Ministry of Finance and the Disclosure of Bad Debts in Japan: A Model*

Takaharu Eto

Working Paper No. 420

May 2002

ISBN: 086381 420 X

The Ministry of Finance and the Disclosure of Bad Debts in Japan: A Model*

Takaharu ETO

School of Economics
Faculty of Economics and Commerce
The Australian National University
Canberra ACT 0200 Australia
Email: taka.eto@anu.edu.au

28 May 2002

Summary

The reluctance of The Ministry of Finance (MOF) to disclose non-performing loans in the banking industry caused a delay in its rescue operations and, as a result, exacerbated the financial crisis in Japan in the 1990s. This paper attempts to answer the question of why the MOF balked at disclosing the bad loan problem. We focus on the reputation concern of the MOF, and develop a model which explores factors that prevented the MOF from truth-telling. The model predicts that the reputation effect might be high in booms and low in recessions. Indeed, the MOF was beginning to announce the amount of bad loans after the economy had entered a recession. The model also enables us to assess the recent development of the Japanese financial system from the perspective of reputation effects.

* This paper is prepared for various seminars in Australia and Japan in order to obtain comments and suggestions. I would like to thank Jenny Corbett, Simon Grant and Graeme Wells for their comments

1. Introduction

The 1990s was a decade of turmoil for Japanese financial intermediaries, in sharp contrast to the late 1980s when Japanese banks seemed invincible. During the 1990s many banks and other financial institutions disappeared. Some simply went bankrupt and others were agglomerated into relatively healthy banks although those that have survived are still struggling to deal with the problems posed by bad loans and weakening capital positions. Large-scale restructuring is still in progress for all types of financial institutions including commercial banks, long-term credit banks, trust banks, securities companies and insurance companies.

A widely held view is that the forbearance policy by the government in general, and the Ministry of Finance (MOF) in particular, exacerbated the problems facing financial institutions (see, for example, Kanaya and Woo (2000), Horiuchi (1998), Takao (1998)). The MOF was responsible for the supervision and the development of the financial industry for most of the 1990s[1] but it attempted to postpone dealing with the bad loan problems until 1997, when the collapse of a major bank, Hokkaido Takushoku, was inevitable. This represented the first bankruptcy of a city bank in Japan's post-war history. The financial distress of two long-term credit banks—Long Term Credit Bank of Japan and Japan Credit Bank—followed immediately. A series of major bank failures forced the government to face the problems associated with an ailing financial industry and accentuated the necessity of decisive rescue measures; that is, a capital injection using taxpayers' money to rescue viable financial institutions. The MOF took seven years to take this action even though concerns about bad loans had arisen as early as late 1990, soon after the bubble burst in asset markets. As Kanaya and Woo (2000) pointed out, the forbearance policy only raised the cost of the financial resolution of the banks.

The MOF's forbearance policy was closely related to its reluctance to disclose bad loans in the banking sector. If the MOF had disclosed the extent of the damage facing banks, it would have taken less time to reach a consensus on injecting taxpayers'

[1] In 1998 most financial regulatory functions including inspection and supervision were separated from the MOF and taken over by the Financial Supervisory Agency. In July 2000 all functions were integrated into the newly established Financial Services Agency.

money into troubled but still viable banks. However, the MOF was unwilling to release figures relating to bad debts to the public. This awkward stance on the part of the MOF made the public suspicious about the necessity for an injection of public funds. Eventually, the MOF missed its opportunity for effective implementation of the rescue packages, and this simply caused Japan's financial predicament to deteriorate further.

The above brief discussion suggests that an analysis of why the MOF postponed dealing with the problem boils down to an analysis of why the MOF attempted to delay disclosing the true financial position of banks to the public after the asset bubble burst at the beginning of the 1990s. A series of episodes, which we refer to later, suggests that the MOF tried to keep the lid on troubles in the financial system as long as possible, resulting in forbearance.

The purpose of this paper is to provide an explanation as to why the MOF was reluctant to disclose the true financial health of banks suffering from bad loans. Our focus is on the MOF's reputation concerns. Under asymmetric information all agents —including workers, managers and lawyers—have an incentive to take advantage of the asymmetry to increase their utilities. Regulatory authorities also face the same incentive, and the MOF is no exception. Rather, the incentive for gaining reputation could be more acute in non-profit organizations since performance is not directly reflected in salaries. This would apply to all government ministries, including the MOF.

A vast literature has addressed the questions regarding the Japanese financial crisis (See, Economic Planing Agency (1993), Kanaya and Woo (2000), Noguchi (1992)). However, there are surprisingly few papers examining the issues based on theoretical models. Horiuchi and Shimizu (1998), and Gower (1995) are notable exceptions. This paper is an attempt to provide an analytical framework for understanding the origins of financial problems. The model that is developed in this paper sheds light on defects in the institutional arrangements of Japan's post-war financial regulatory system. It also enables us to assess a series of reforms in the supervision and monitoring system (e.g. the separation of monitoring functions from the MOF, reduced involvement of the MOF in corporate accounting rules).

The paper proceeds as follows. Section 2 explains the relationship between the MOF and Japanese banks from the perspective of disclosure. This section also describes how slowly the disclosure of bad loans has progressed. Section 3 introduces our reputation model and draws some implications in relation to a regulatory authority's decision-making. How those implications relate to Japan's particular situation is the subject of section 4. We show that institutional arrangements and economic circumstances preconditioned the likelihood of equilibria in which the MOF preferred not to disclose a bank's bad loans. Section 5 concludes.

2. Background

Why was the MOF responsible for banks' disclosure?

One might be puzzled as to why the MOF should be blamed for the insufficient disclosure of the financial state of banks. Most banks are listed on the stock market. It is the responsibility of each individual bank to report its financial results and balance sheet to its stockholders and general investors. Hence, responsibility for disclosure would seem to fall on to banks in the first instance. However, institutional arrangements allowed the MOF to be involved in the preparation of each bank's financial report.

A troubled bank was not allowed to release its periodical results without the MOF's permission, which was called the 'ex ante result approval system.' In principle, the system was aimed at enabling the MOF to prevent ailing banks from "windowdressing" their bad results. But the other side of the coin is that the MOF could also cover up the financial problems that banks were suffering. Horiuchi (1998) claims that the MOF tended to exploit the system for the latter purpose. He cites the MOF's handling of Musashino Credit Union as a case in point. The failure of the credit union came to the surface in September 1996. However, it is said that the MOF had already recognized the critical condition of this institution as early as March 1993, more than three years before the bankruptcy. The MOF did not allow the credit union to announce its statement of accounts while in the red. Instead the MOF asked the credit union to get its accounts back in the black by any means. Another example

is the Sumitomo Bank case, in which the bank planned to write off a large amount of bad loans in the early 1990s. The bank believed that it would make a loss, but that the write-off would help the bank strengthen its financial position in the long run. Again, the MOF stopped Sumitomo Bank from writing off its loans and reporting a loss.

One might be able to argue that the financial position of each bank was adequately disclosed in the sense that statements of accounts were subject to Japanese corporate accounting rules. However, the accounting rules themselves have many defects and, as Kuroda (1997) pointed out, the MOF was the major player that set the rules. In general, historical-cost accounting was applied to assets held by financial institutions as well as to assets held by non-financial institutions. Thus, there could be a wide discrepancy between the value of assets at historical cost and the value at market price. That is, bank balance sheets did not reflect the actual value of assets and liabilities because unrealised profits and losses were not counted appropriately. Assets tended to be overvalued under historical-cost accounting in the years after the bubble burst. The guidelines for corporate accounting were set by the council of corporate accounting, which was one of the MOF's advisory councils. The council was supposed to be free from the influence of the MOF but in reality it was under the control of the MOF, as were other councils. Facing increasing concerns about the financial health of banks, the MOF eased accounting requirements rather than tightening them. For example, from 1997 banks were allowed to value stock holdings in their investment accounts either at cost, or at the lower of cost and market value. Only the latter option had been available until then. It is not surprising that the MOF was suspected of helping the banks to conceal their problems.

This short narrative points to the fact that the MOF was deeply involved in bank disclosure from the perspective of both supervision and accounting. As noted earlier, the MOF sometimes attempted to prevent a bank from reporting its ailing balance sheet even though the bank wanted to do so. This may be viewed as strong evidence that the MOF was deeply involved in concealing the bad loan problems. The forbearance policy could be supported only by the MOF's effort to cover up the reality facing banks.

The chronology of the disclosure of bad loans

Soon after the collapse of asset prices in the early 1990, there was a growing concern among market participants of a potential increase in non-performing loans. However, no statistics on bank bad loans were released in the first three years of the 1990s.

Based on a discussion by the Financial System Research Council—an advisory panel of the MOF—in the middle of 1992, the disclosure of some bad loans held by banks became compulsory. Following this guideline, banks announced bad loans in their financial statement reports for the first time at the end of March 1993 (Aibiko 1997).

However, this disclosure was incomplete and insufficient in terms of both the coverage of bad loans and the types of banks subject to the requirement. Consequently it did not reflect the actual amount of non-performing debt in the banking sector. The guideline was applied only to major banks (city banks, long-term credit banks, trust banks). Regional banks, second-tier regional banks and Shinkin banks were exempt and bad loans were also narrowly defined. The released figures accounted only for loans to failing firms and for loans with delayed interest payments. Excluded were loans on which interest payments had been partially or totally waived and loans to firms for which the lending bank participates in management. There were also many other loopholes that enabled banks to cover up the actual amount of non-performing loans.

In November 1995, nearly six years after the bubble burst, the MOF published its first comprehensive report on bad loans entitled "Present Status of Bad Loans by Depository Institutions." This semi-annual report surveyed non-performing loans across financial institutions: commercial banks and shinkin banks, credit cooperatives, labour credit associations, the Shoko Chukin Bank, Norin Chukin Bank and the Federation of Cooperatives. The total amount of non-performing loans for all financial institutions, specific reserve position losses, and other items relating to the health of financial institutions were revealed in the report. However, breakdowns for individual financial organizations were not available.

The coverage of individual institutions' disclosure expanded only gradually. For city banks, long term credit banks, and trust banks, the process of disclosure relating to

bad loans was put in place by March 1997. Regional banks followed. But the balance sheets of shinkin banks are yet to be fully disclosed.

Table 1 the timetable for the bad loan disclosure

Time when disclosure of bad loans became mandatory

	Loans to failing companies	Loans with delayed interest payments	Loans on which interest payments have been totally or partially waived	Loans to firms for which the lending bank participates in management
City banks, long term credit banks, Trust banks	March 93	March 93	March 96	March 96
Regional banks	March 93	March93	March 97	March 97
Second regional banks	March 93	March 97	March 97	March 97
Shinkin banks	March 97	-	-	

3. Model

This section introduces a model that attempts to explain the unwillingness of the MOF in relation to disclosure. The model is related to two areas of the literature. Our model assumes that a regulator is only concerned with its private welfare. A selfish regulator with reputation concerns is analysed by Boot and Thakor (1993). In our model, the regulator is concerned about its own welfare, reputation, and monetary compensation. Boot and Thakor (1993) focus on reputation in relation to a regulator's screening ability. As in their model, our regulator checks whether banks have opted for good loan plans. However, our model allows for reputation arising from interim monitoring as well as screening.

The other area of literature is one relating to financial problems in Japan. Corbett and Mitchell (2000) and Horiuchi and Shimizu (1999) provide some theoretical insights on this issue. Corbett and Mitchell (2000) show that the cost of bank restructuring can be higher when bank managers have reputation concerns. Horiuchi and Shimizu

(1999) argue that the long-term relationship between the MOF and banks may lead to the MOF's lukewarm monitoring through "amakudari" (Japanese style revolving doors). Our model is similar to Corbett and Mitchell (2000).

Three features distinguish our model from the Corbett and Mitchell model. First, they concentrate their attention on troubled banks' response to a rescue package offered by the government. Their model provides a good description of Japanese bank behaviour in the late 1990s, when the government offered them a capital injection. In contrast, the focus of our model is on a regulator's behaviour when it is faced with a bad loan problem in the banking sector. Our model focuses on why the MOF hesitated to disclose bad debts in the early 1990s.

Second, Corbett and Mitchell (2000) assume that beliefs on information sets off the equilibrium are identical to the prior distributions. This guarantees the existence of undesirable equilibria with inefficient outcomes. In our model we do not put any restriction on off-equilibrium beliefs and allow them to take arbitrary forms of probability distributions. In our more general setting, undesirable equilibria do not necessarily occur but can still exist. As such, beliefs matter.

Third, in contrast to Corbett and Mitchell (2000), we assume that the probability distribution of the states of the world is dependent on the type of regulator. In their setting, the assumption of independently distributed types would not be problematic because it is unlikely that the type of manager is correlated with the states of the world. In our setting this assumption would not be plausible. We are concerned about Japan, and the Ministry of Finance in particular. The MOF is responsible for fiscal policy and the tax system as well as the supervision of the financial industry. Its decisions and behaviour may have a substantial impact on the state of the economy. Thus, it would be a more suitable assumption for Japan that the states of the world have some informational content on the type of the MOF, or vice versa. We show later that this interdependence has very important implications regarding the MOF's behaviour in the 1990s.

A. The Structure of the Model

Consider an economy with a regulator, a bank, a rating agency, and the Diet. The Diet and the rating agency should be broadly interpreted. The Diet represents markets or institutions for which their response to the regulator's reputation has an great effect on the regulator's benefit; this could be the public or the market for post-retirement jobs with the regulator. The rating agency represents monitoring systems in the private sector and can be accountants or analysts of securities companies. The regulator is responsible for ex ante, interim, and ex post monitoring of individual banks. Ex ante monitoring includes screening banks' loan plans and checking the adequacy of the plans. Interim monitoring is to monitor whether banks properly supervise the project financed by the loan. In ex post monitoring the regulator is responsible for the inspection of loan performance and rescue operations in the event of a bad loan problem.

There are three periods. In period *0* a bank plans a loan, and extends the loan if the regulator permits. In terms of screening ability there are two types of regulator: smart *(S)* with a probability of p and dumb *(D)* with $1-p$. A bank's loan plan is better screened by the smart regulator than by the dumb regulator in the sense that the former always turns to be better at period *1* under the same state of the world.

In period *1* one of the two states of the world is realized: the high state *(H)* occurs with a probability of q and the low state *(L)* with $1-q$. The performance of a loan is good, bad or very bad, which depends on the type of the regulator and the state of the world. The probability that the regulator is smart and the state is high is x. In this event the loan is always good. The probability that the regulator is smart and the state is low is $p-x$. Then the loan is always bad. The probability that the regulator is dumb and the state is high is $q-x$. In this event the loan is always bad. The probability that the regulator is dumb and the state is low is $1+x-(p+q)$. Then, the loan is very bad. Thus, the types of the regulator and the states of the world are not necessarily statistically independent. We allow the possibility that there exists some correlation between the distributions of types and the states. It would not be unreasonable to assume that the regulator could affect the realization of the states through some policy such as fiscal or monetary policy.

Table 2 The Quality of a Loan

	High State (q)	*Low State (1-q)*
Smart Type (p)	*Good (x)*	*Bad (p-x)*
Dumb Type (1-p)	*Bad (q-x)*	*Very Bad (1+x)-(p+q)*

The regulator inspects the quality of the loan provided by the bank at period *1*. We assume that there is no difference between both types of the regulator with respect to ex post monitoring: the verification of quality of loans and the rescue of troubled banks. Each type can always detect a loan's quality. This amounts to symmetric information on loan quality between the regulator and the bank. Both parties know precisely the nature of debts.

Observing the loan's quality, the regulator makes a decision on his report to the Diet.[2] Here we make some assumptions relating to the regulator's decision-making. First, the regulator is supposed to report to the Diet only if a loan is either bad debt or very bad debt.[3] In other words, the duty to protect privileged information prohibits the regulator from reporting to the Diet as long as the quality of a loan turns out to be good. Thus, the Diet receives no report from the regulator when a loan is good. Second, the regulator must rescue the bank if it finds out that the quality of a loan is either bad or very bad.[4] However, the Diet cannot know at period *1* if the regulator has behaved properly. Thus, the decision of whether or not to report is virtually left at the discretion of the regulator.

As for the cost of a rescue operation *T* at period *1*, we assume that the cost is financed by tax and is a function of the quality of a loan. If the regulator chooses no report and takes a wait-and-see attitude, the loan with quality bad or very bad deteriorates further and its expected future net worth decreases by *z* at the end of period *1*. From the taxpayers' point of view, this implies that a rescue at period *2* is more costly than a rescue at period *1*.

[2] We alternatively use the word "disclose" for "report" and "conceal" for "no report".
[3] We assume that the regulator's report is hard (verifiable).
[4] Whether or not a bank knows that the regulator must rescue a bank in trouble may affect banks' behaviour. But this is not considered in this paper.

The quality of a loan is examined not only by the regulator but also by the rating agency. Rating agencies usually have less access than regulatory authorities to information on a bank's business and are less likely to find out the true quality of loans. Here we assume that with a probability of *1-h* the rating agency obtains the signal from a bank that the loan is bad if it is actually bad. But it overlooks the signal with the probability of *1-h*. On the other hand, the rating agency never receives the signal that the loan is bad if it is good. Hence the Diet has some chance to know of a bad loan with probability *h* even though the regulator does not report the result of its inspection to the Diet.[5] When the rating agency finds out that a bank loan is bad or very bad, we assume that the regulator must implement a rescue package to help the bank recover from its troubled situation.

In period *2*—which has only one state of the world—the true quality of the loan is revealed. If the regulator does not report the bad loan problem and the rating agency cannot detect it in period *1*, then the rescue operation is implemented. As noted earlier, taxpayers have to bear a greater cost for a rescue in period *2* than for a rescue in period *1*.

B. Information Structure

We assume that in period *0* both the regulator and the bank know the regulator's type.[6] Thus, both parties have the same information about the quality of the loan. No asymmetric information arises between the regulator and the bank with regard to state-contingent loan performance. On the other hand, the Diet does not identify the type of the regulator, but does have a prior assessment of the type of the regulator. It believes that the regulator is either smart with a probability *p* or dumb with *1-p* in period *0*.

In period *1*, the regulator and the bank simultaneously observe the realized state of the world. The regulator also detects the quality of the loan with certainty. Again there is no asymmetry between the two parties. At the beginning of period *1*, in contrast, the Diet can neither know directly what state is realized nor how the loan has performed. However, the Diet can conjecture, using available information. Based on its own

[5] The rating agency's information is also assumed to be hard.

information and the information provided by the regulator and the rating agency, if any, the Diet updates its assessment about the type of the regulator by using Bayes' rule. At the end of period *2*, all parties observe the performance of the loan and there is no information asymmetry with regard to the loan. The Diet uses Bayes' rule to update its belief again.

C. The regulator's objective function

The regulator's objective function has two terms. The first term is the cost of implementing a rescue operation and the second is the regulator's reputation with the Diet at the end of period *1*. The general form of the regulator's expected utility is given by

U=-(1-w)(expected cost of rescue operation)+wEp

where *Ep=E[Prob(type=smart: available information to the Diet in period 1)]*, *w<1* is the weight put on the reputation term. The reputation is defined as the conditional probability that the regulator is smart at the end of period *1*. We assume that the regulator has only a short-term concern regarding its reputation, and that the reputation at period *2* is not considered. The regulator may be concerned about the public's perception of his ability for several reasons. A good reputation might help the regulator to get a job after retirement. Alternatively, the regulator values his reputation more than his monetary benefits because the monetary benefits are usually insensitive to the regulator's performance.

Equilibrium Regulator's strategies

As the benchmark case, consider that the regulator has no reputation concerns, i.e., *w=0*. In this case the regulator's problem is reduced to a rescue cost minimization problem. It is straightforward that the optimal strategy of the regulator is "report" for any positive cost of roll-over *z*. We can draw the same conclusion if there is no asymmetric information between the Diet and the regulator. This is the first best policy in the taxpayers' point of view.

[6] Whether or not the bank knows the regulator's type does not affect the following discussion.

Now we proceed with our analysis where the regulator's reputation concern is prevalent. Our analysis focuses on pure strategy equilibria. We examine under what conditions particular type of equilibria occur when the regulator considers roll-over cost and the Diet's updating of the regulator's reputation. There are three strategies for the regulator contingent on the type of regulator, the state of the world, and the loan quality. To simplify our analysis, we assume that the loan quality is observed by the Diet when it is very bad. Then, the following lemma immediately follows.

Lemma 1

For the dumb regulator with a very bad loan under the low state, "report" is the weak dominant strategy.

Proof.

We are assuming that the Diet can detect the true loan quality if the loan is very bad. Thus, observing the very bad loan, the Diet conjectures that the regulator is dumb and the state is bad. As a result, the regulator cannot benefit from concealing the loan quality because the Diet puts zero on the probability that the regulator is smart. In addition, the regulator has to restructure the very bad loan at the cost of *T(very bad)*, whether or not the regulator reports to the Diet. Hence the regulator's payoff from disclosing and concealing is exactly the same.□

The lemma allows us to assume that the regulator always reports if the loan is very bad (i.e. the regulator is dumb and the state is low). Therefore, we can concentrate on the strategy of the smart regulator with a bad loan under the low state and the strategy of the dumb regulator with a bad loan under the high state[7], because we can distinguish the strategy profiles of the regulator by these two regulator's strategies.

Let us use the notation (s_h, s_l), where s takes a value of either *d (disclose)* or *c (conceal)* and s_h refers to the strategy that the dumb regulator chooses when the state is high, and s_l refers to the strategy that the smart regulator chooses in the low state.

Our questions here are, first, how the regulator's strategy differs from the strategy producing the first best outcome. Second, how much do taxpayers have to bear to induce the regulator to report loan quality truthfully? Third, how do parameter values affect the type of equilibria and the cost of truth-telling? Finally and most importantly, we are interested in the way that correlation between the regulator's type and the state of the world impacts on the regulator's strategy.

Pooling Equilibrium *(c, c)*

Let us consider the possibility that the dumb regulator with a bad quality loan in the high state and the smart regulator with a bad quality loan in the low state pool chooses the strategy *c*, and the conditions for the existence of these equilibria. Note that despite the strategies the values of the utility functions for both dumb regulator with bad loan in the high state and the smart regulator with bad loan in the low state are identical. The expected utility for each regulator if it does not report is

$$U(c: (c,c)) = -(1-w)(T(bad)+z) + w[hp^{g}(c: (c,c)) + (1-h)p^{b}(c: (c,c))]$$

Where $p^{g}(c: (c,c))$ denotes the regulator's updated reputation when he does not report and the rating agencydoes not find out loan performance, given that the Diet expects each regulator with bad loan performance not to report. The term $p^{b}(c: (c,c))$ denotes each regulator's reputation when they do not report and the rating agency detects the true loan performance, and the Diet believes the rating agency's report. All values of the reputation terms are given in the appendix.

Each regulator's expected utility if they report the quality of a loan is

$$U(d: (c,c)) = -(1-w)T(bad) + wp^{b}(d: (c,c))$$

where $p^{b}(d: (c,c))$ is the off-equilibrium belief of the Diet that the type is smart when the regulator discloses the banks' loan quality. For the pooling equilibrium *(c,c)* to exist, the IC constraint $U(c: (c,c)) \geq U(d: (c,c))$ must be satisfied. So,

[7] If the regulator is smart and the state is high, "not report" is the only available strategy for the smart

$z<[hp^g(c:(c,c))+(1-h)p^b(c:(c,c))-p^b(d:(c,c))]w/(1-w)$

must hold. Unfortunately, the RHS is not always positive. If $p^b(d:(c,c))$ is large enough, then the RHS is negative and equilibrium *(c,c)* does not exist. However, the RHS is positve if $p^b(d:(c,c))$ is small enough. This IC constraint implies that if the cost incurred by not reporting is low enough, the regulators choose "no report". Define the following critical value, equal to the RHS of the above IC constraint.

$V^c(h,x,p,q,p^b(d:(c,c))) = [hp^g(c:(c,c))+(1-h)p^b(c:(c,c))-p^b(d:(c,c))]w/(1-w)$

V^c is a function of various parameters: the monitoring ability of the rating company, the probability that the regulator is smart and the state is high, the marginal distribution of the smart regulator, and the marginal distribution of the high state. All these parameters affect the critical value for the existence of a pooling equilibrium *(c,c)*. We also note that V^c is made up of three components: the success rate of hiding loan performance, the reputation effect from the regulator's strategy, and the relative importance of reputation.

As we already mentioned, when there is no reputation concern on the part of the regulator or when all parties have symmetric information, we can have only the first best outcome *(d,d)* in the taxpayer's point of view. Once reputation and asymmetric information are introduced, other types of equilibria are possible, which may cost taxpayers more than the first best outcome.

Pooling Equilibrium *(d,d)*

The values of the utility functions of the dumb regulator with bad quality loan in the high state and the smart regulator with the bad quality loan in the low state are again the same. The expected utility for each regulator with the bad loan performance if it reports the loan performance is given by

$U(d:(d,d)) = -(1-w)T(bad) + wp^b(d:(d,d))$

---

regulator.

If each type of the regulator deviates from the equlibrium strategy, its expected utility is

$U(c:(d,d)) = -(1-w)(T(bad)+z) + wp^b(c:(d,d))$

where $p^b(c:(d,d))$ is the off-equilibrium belief of the Diet that the type is smart when the regulator conceals the banks' bad condition. For the pooling equilibrium *(d,d)* to exist, each regulator's IC constraint

$z>[\{h\, p^g(c:(d,d)) + (1-h)p^b(c:(d,d))\} - p^b(d:(d,d))]w/(1-w)$

must be satisfied. The RHS is not always positive. If $p^b(d:(d,d))$ is large enough, then the RHS is negative and the equilibrium of *(d,d)* always exists. However, the RHS is positve if $p^b(d:(d,d))$ is small enough. This IC constraint implies that only if the cost incurred by not reporting is high enough will each regulator choose to report. Define the following critical value, equal to the RHS of the above IC constraint.

$V^d(h,x,p,q,p^b(c:(d,d))) = [\{h\, p^g(c:(d,d)) + (1-h)p^b(c:(d,d))\} - p^b(d:(d,d))]w/(1-w)$

This result states that the equilibrium *(d,d)*, which is the first best outcome without reputation concern and asymmetric information, also exists with them. Similar to V^c, V^d also has three terms: the success rate of hiding, the reputation effect, and the relative importance of reputation.

Separating equilibrium *(d,c)*

There exists no separating equilibrium *(d,c)*. By separating the strategies in this way, the Diet conjectures that the regulator is smart with certainty when he reports. The dumb regulator cannot enjoy such a gain from the reputation effect. In addition, not reporting is costly because of the delay in rescue operation. Hence, the dumb regulator has an incentive to mimic the smart regulator. This consideration destroys *(d,c)*.

Separating Equilibrium *(c,d)*

In contrast to equilibrium *(d,c),* the separating equilibrium *(c,d)* can exist. This separation makes the Diet believe that the regulator is dumb with certainty when he reports. The dumb regulator cannot expect a reputation effect but he can save the cost of a wait-and-see approach. On the other hand, the smart regulator can fully enjoy the reputation effect but he must bear the cost of the roll-over of the bad loan. Thus, each regulator may have no incentive to deviate from its equilibrium strategy.

Characterization of equilibria

Now we state the characteristics of the pure strategy equilibria. The following propositions describe the equilibria with strategies for both the smart regulator with bad loan performance in the low state and the dumb regulator with bad loan performance in the high state.

Proposition 1

An equilibrium (d,d) exists if $z > V^d(h,x,p,q, p^b(c: (d,d)))$. *An equilibrium (c,c) exists if* $z < V^c(h,x,p,q, p^b(d: (c,c)))$. *This is possible when* $p^b(d: (c,c))$ *is small.*

Proposition 2

(i) Equilibria of the form (d,c) do not exist; (ii) Equilibria of the form (c,d) exist for are restricted range of parameter values.

Now, we explore how changes in parameter values affect the critical values $V^c(h,x,p,q, p^b(d: (c,c)))$ and $V^d(h,x,p,q, p^b(c: (d,d)))$. From now we assume that $p^b(d: (c,c))$ is fixed and small enough to assure that $V^c(h,x,p,q, p^b(d: (c,c)))$ is positive in the domain of other variables. We also assume that $p^b(c: (d,d))$ is fixed and large enough for $V^d(h,x,p,q, p^b(c: (d,d)))$ to be positive in the relevant domain. Let us look at the success rate of hiding the bank's loan performance h. Differentiating $V^c(h,x,p,q)$ and $V^d(h,x,p,q)$ with respect to h gives us the following proposition.

Proposition 3

(i) $V^c(h,x,p,q)$ *is an increasing function in* h *if* $h<1/2$ *and decreasing function if* $h>1/2$;

(ii) $V^d(h,x,p,q)$ *is an increasing function for all* h.

It is interesting to see that $V^c(h,x,p,q)$ is not increasing for all h while $V^d(h,x,p,q)$ is an increasing function for all h. This is because there is a trade-off between the benefit from no reporting and the benefit from a reputation effect. As we noted, $V^c(h,x,p,q)$ consists of three elements; the success rate for hiding bad loan, the reputation effect, and the relative importance of reputation. An increase in h brings more benefits to the regulator in the sense that the rating agency is less likely to find out that the bank's loan is in trouble. However, this makes more unreliable the belief that the regulator is smart when the Diet observes no report by the regulator and no revelation by the rating agency. For small h, the former effect is larger than the latter. As h increases, the benefit from hiding is offset and overcome by the loss of reputation effect. Hence, the poor rating agency does not necessarily expand the range for equilibrium *(c,c)*. As opposed to this, an increase in h is followed by an increase in $v^d(h,x,p,q)$. The reputation effect is irrelevant to h since the reputation term is not a function of h and. Thus, the total utility directly reflects a rise in the success rate h. This implies that the poorer the rating agency, the more costly it is to report truthfully.

Next, we consider the impact of the probability x that the regulator is smart and the state is high. Differentiation with respect to x gives us the proposition below.

Proposition 4

(i) $V^c(h,x,p,q)$ is a increasing function in x if $p>q$.

(ii) $V^d(h,x,p,q)$ is an decreasing function in x if $p>q$ and increasing if $p<q$.

This proposition shows that the relative magnitude of the marginal distribution of the smart regulator p to that of the high state q matters. The first part of Proposition *4* states that $p<q$ is sufficient for $V^c(h,x,p,q)$ to increase in x but that $V^c(h,x,p,q)$ is not necessarily increasing if $p>q$. The greater the probability x that the regulator is smart and the state is high, the larger the region of roll-over cost z for which both types of regulator hide the true loan performance. However, if $p<q$, the range may become smaller as x increases.

In contrast to the case of $V^c(h,x,p,q)$, we have clear-cut results for $V^d(h,x,p,q)$ in the second part of Proposition *4*. When the prior probability of p that the regulator is

smart is smaller than the prior probability of q that the state is high, as x increases, the narrower the range of roll-over cost z for which there exists the truth-telling equilibrium *(d,d)*. On the other hand, if $p>q$, the range for the equilibrium is wider.

The latter results are surprising because they run counter to intuition. Intuitively, when the smart type and the high state are positively correlated in the sense that x is large enough, the reputation effect is also large. To compensate for the loss of that effect, the regulator seems to be willing to bear a large roll -ver cost z compared with the case when x is small. This makes taking the strategy of "report" costly. However, this conjecture is not always true. Given the unconditional probability of p that the regulator is smart and the unconditional probability of q that the state is high, an increase in x implies a decline by the same amount in the probability $p-x$ of the smart type and the low state and the probability $q-x$ of the dumb type and the high state. The impact on the conditional probability that the regulator is smart when it reports bad loan quality to the Diet depends on those probabilities, $p-x$ and $q-x$. If $p>q$, $q-x$ is more affected by a change in x rather than $q-x$ and vice versa. That is, reputation in the equilibrium *(d,d)* increases, which reduces the opportunity cost of "report". Thus the relative magnitude of p and q is crucial to the direction of a change in $V^d(h,x,p,q)$ followed by a change in x.

We now consider how the correlation between type and state affects the regulator's strategy. First, as a benchmark case, suppose that the types and the states are independently distributed. Then, under the condition that the state is high, the conditional probability that the regulator is smart is equal to the conditional probability under the low state. The information about the state is not useful when conjecturing the regulator's type. Then $x=pq$. We denote $V^{di}= V^d(h,pq,p,q)$ and $V^{ci}= V^c(h,pq,p,q)$. These are the critical values for the roll-over cost in which equilibria *(d,d)* and *(c,c)* exist when the types and the states are statistically independent. Let us suppose that the smart type and the high state are positively correlated if $x>pq$ and that they are negatively correlated if $x<pq$. We rephrase Proposition *4*.

Proposition 5

(i) For $p>q$, if the smart type and the high state is positively correlated, then $V^c(h,x,p,q)>V^{ci}$.

(ii) For $p<q$, if the smart type and the high state is positively correlated then $V^d(h,x,p,q)>V^{di}$.
(iii) For $p>q$, if the smart type and the high state is positively correlated then $V^d(h,x,p,q)<V^{di}$.

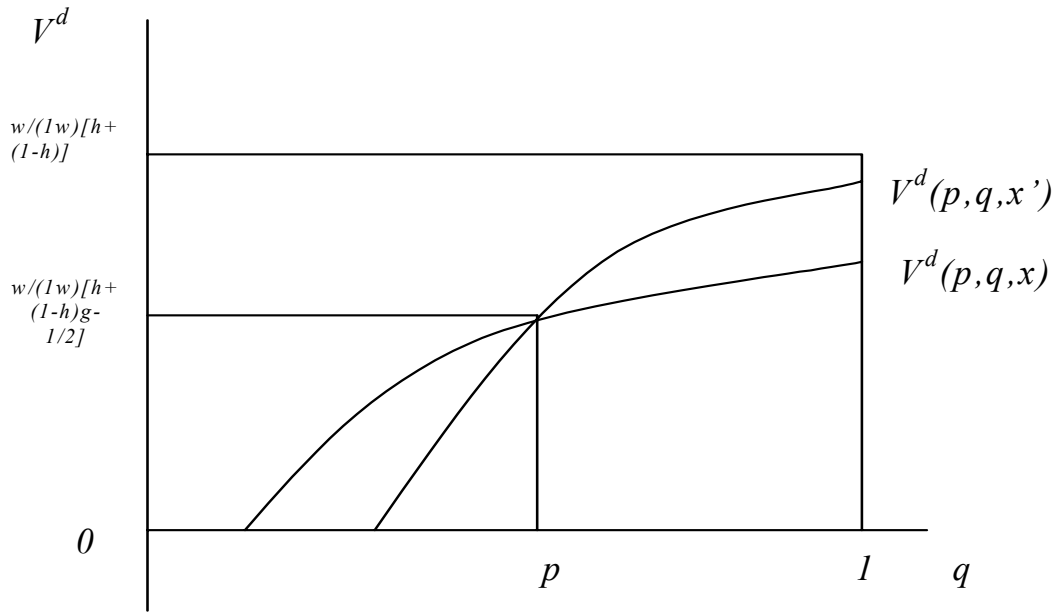
If the smart type and the high state are negatively correlated the opposite of Proposition *5* holds.

This proposition has interesting implications when we interpret the states of the world as reflecting the interim monitoring ability of the regulator. That is, we interpret the state of the world as the type of the regulator in terms of interim monitoring (high and low states represent high and low ability in interim monitoring). Then, the correlation between the types and the states of the world is considered to be the same as that between screening ability and interim monitoring ability. Greater x implies better ability in both screening and interim monitoring while smaller x implies either the combination of better screening and worse interim monitoring or worse screening and better interim monitoring.

Proposition *5* states that *for* $p<q$ if the screening ability and interim ability are positively correlated the range of roll-over cost z for the truth-telling equilibrium *(d,d)* is narrower than the range for the case where they are independent. When there is negative correlation, the range is wider. The stronger the positive correlation, the narrower the range for the truth-telling equilibrium. The stronger the negative correlation, the wider the range. This is a remarkable result because weak interim monitoring ability mitigates reputation effects. In contrast, for $p>q$ the strong positive correlation between screening and interim monitoring expands the range of the truth-telling equilibrium.

In general, both good screening ability and high interim monitoring ability are thought to be desirable for a regulator. Surprisingly, this is not necessarily the case. Rather, it may have an adverse effect on taxpayers if $p<q$. On the other hand, good screening ability and interim ability mitigate reputation effects if $p>q$.

Figure 1 The Cost of Reporting



We now investigate the effect of the distributions of types p and of state q on the cost of truth-telling V^d. In figure 1, V^d and $V^{d'}$is illustrated as a nondecreasing function of q given p and x and x' *(x'>x)*. Each curve has a flat portion for low q and then starts to increase. It is clear that if q is low enough relative to p and x is small, then a small change in q does not affect V^d and the *(d,d)* equilibrium always exists (because V^d *=0*). However, if q is close to p and x is close to p, an small increase in q increases V^d substantially. This change would make equilibrium *(d,d)* more unlikely. To put it differently, when the probability that the regulator is smart is large enough, the probability that the state is high is very low, and x is very low, V^d is insensitive or only slightly sensitive to a small change in q. However, when the probability of a smart regulator and that of a high state are very close and x is high, a small change in q increases the probability of the *(c,c)* equilibrium.

Next, we examine the effect of p. It is easy to see that if p rises, V^d decreases. If the Diet has a stronger belief that the regulator is smart, then V^d falls.

The model also suggests that the path of bank loan quality is very important when reputation concern exists. From the taxpayer's point of view, a short-term critical bad

loan problem can be better than a long-lasting bad loan problem. Suppose that $T(bad)<T(very\ bad)<T(bad)+z$. Then bad loan performance may be more costly for the taxpayer because the regulator succeeds in hiding bad loans with some positive probability, while very bad loan quality is always discovered.

4. Discussion

The above results from our model shed light on the question of why the MOF was reluctant to disclose banks in trouble in line with Japan's regulatory framework, and enable us to evaluate the restructuring of the regulatory system and ongoing reform of the accounting system.

Proposition *3* shows that the cost for truth telling V^d is increasing in h, the success rate for hiding problems. This rate is dependent on two factors: accounting rules and monitoring institutions. If the system of accounting itself does not reflect banks' true financial positions, it will be very difficult for outsiders to know how badly banks are doing. Monitoring institutions such as rating companies play a complementary role in inspecting banks' financial health because they are concerned with how bank loans are performing in terms of not only accounting but also non-accounting aspects.

From the perspectives of the accounting system and monitoring institutions, the success rate for hiding troubles might have been relatively high. As we discussed in Section 2, the MOF had the power to set accounting rules, particularly those applicable to the financial industry. Instead of improving the accounting rules, the MOF often abused its authority and accommodated accounting standards which would enable banks to manipulate their financial results and thereby cover up their problems. A well-developed monitoring or evaluation organization serving investors could have compensated for this arbitrary accounting system. Unfortunately, such institutions did not exist in Japan. There are three rating companies in Japan, but they are relatively new and their skills in rating are immature relative to US rating companies such as Standard & Poor's and Moody's. When banks are listed on the share market, analysts in securities companies are also expected to play an important role in monitoring. However, the importance of corporate analysis was often ignored

by securities companies. Sales departments often tended to put pressure on research departments not to make bad reports on listed companies, which represented good clients. In addition, main banks were traditionally responsible for monitoring firms. Thus, ability in corporate research had not been well established and the securities companies were not functioning as a watchdog for investors.

The above discussion illustrates how the corporate monitoring system was weak in Japan. Hence, it is not unreasonable to assume that the success rate of hiding troubles in banks was high during the early 1990s in Japan.

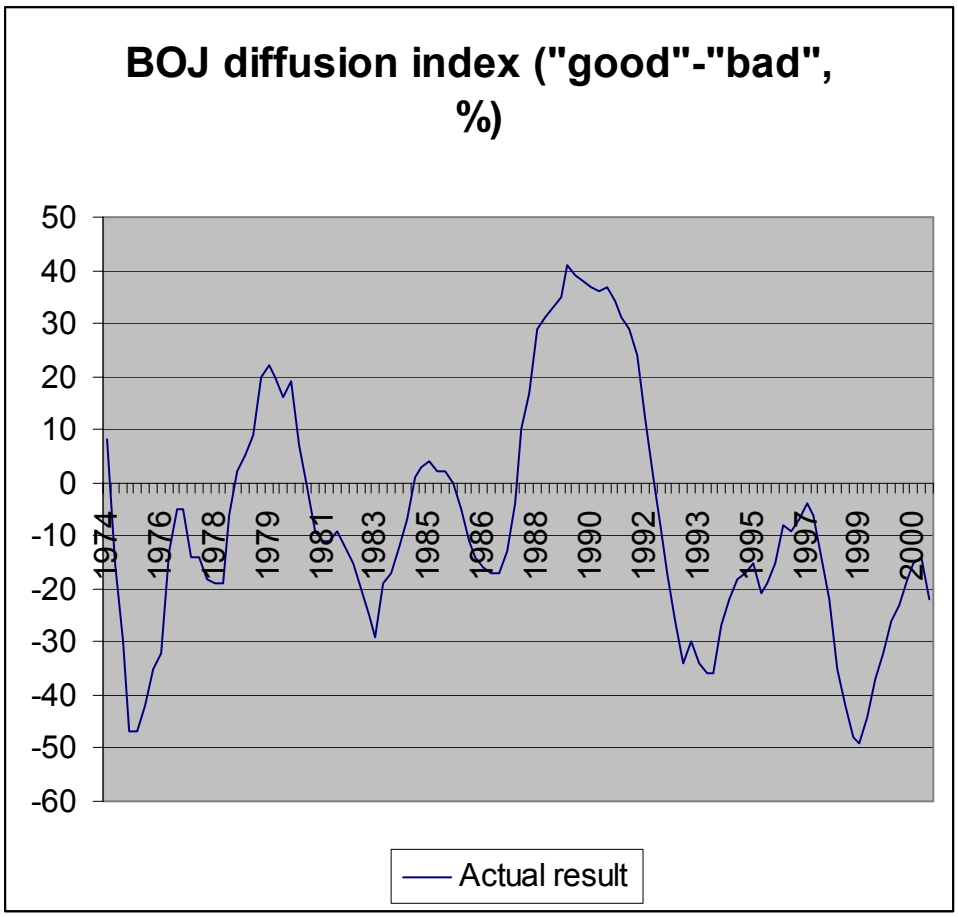
Our model predicts that the cost of truth telling increases rapidly if the probability of smart regulator p and that of high state q are very close and their correlation is very high. When q changes from $p<q$ to $q>p$, this effect is acute and the probability of the *(d,d)* equilibrium declines sharply. But when a change takes place in the opposite direction, the *(d,d)* equilibrium becomes much more likely.

To relate the above predictions to the bad loan problem, we review the economic conditions in Japan in the past twenty years (*Figure 2*). In the mid-1980s Japan was in a recession which had been triggered by a sharp appreciation of the yen following the Plaza Accord in September 1985. In 1986 the economy hit bottom and started to recover, buoyed by easy monetary policy and lower oil prices. The strong yen, which had badly affected export industries, was beginning to have a favourable impact through an increase in the nation's purchasing power. Although the worldwide crash in the stock markets in November 1987 upset the economy temporarily, Japan continued to grow vigorously at a rate of 5%. The boom from 1986 onwards was the one of the longest expansions in Japan's post-war history. However, the boom ended in the early 1990s following the collapse of land and stock prices.

Hence, the probability of high state q might have been lower than that of smart regulator p in the mid-1980s. Thereforethe cost of truth-telling was low.
However, as the economy expanded strongly, the assessment of the economy improved. This implied an increase in q, which in turn increased the cost of truth-telling. From this point of view, it is understandable that the MOF refused to disclose banks' non-performing loan problems. The disclosure of trouble in banks might have

been stronger evidence that the MOF was less capable of monitoring in a boom than in a recession. Our model predicts not only the MOF's reluctance to encourage disclosure in the early 1990s but also its subsequent decision to promote disclosure. As the economy deteriorates, bank problems are less likely to be interpreted as evidence of the MOF's ability (or lack of ability) to supervise the financial industry.

Figure 2 Japan's Economic Condition



From the viewpoint of our model, the Japanese economic environment—a weak bank monitoring system and a boom in the economy—paved the way for the MOF's reluctance to reveal problems within the banking industry. Thus it is not surprising that the MOF was slow to implement a rescue operation for the ailing banking system in line with the financial system's true state of health.

Facing a prolonged recession and ongoing financial confusion, the nation has become well aware of the need for a well-developed accounting system which is independent

of the MOF and reflects the true value of firms' assets and their business operations. Some change has been taking place over the past few years. We evaluate these changes based on our model.

The most important change in the regulatory framework in the 1990s was the separation of monitoring functions from the MOF. As of January 2001, the Financial Services Agency (FSA) finally took over most of the MOF's financial regulatory functions through several interim organizations. These functions include planning and formulation of the legal system, inspection and supervision, and oversight of the Securities and Exchange Surveillance Commission. This restructuring of the regulatory framework is expected to decrease the degree of correlation between the state of the world and the type of the regulator. Under the old regime, the MOF had authority over the budget, taxation, and financial industry supervision, and was powerful enough to affect the state of the economy whether this was conscious or not. Thus, the type of the regulator and the state of the world must have been correlated. As we have shown earlier, if the type and the states are correlated, a positive correlation can either increase or decrease the cost of truth-telling, depending on the sign of p-q. The relation between the type of the FSA and the state of the world is expected to be more independent than that between the type of the MOF and the state of the world since the FSA is only responsible for supervision of the financial industry. This implies that the cost of truth-telling is less volatile as the assessment of the state changes.

The 1990s saw proposals to improve the way in which accounting rules are determined as well as a weakening of the power of the MOF to set accounting rules through its advisory committee. Now a committee made up of accounting specialists from the private sector has become the entity which sets accounting rules in line with international standards. Hence the MOF's discretionary power over accounting codes has lessened, and this will contribute to fuller disclosure of firms' management in both the financial sector and the nonfinancial sector. In addition, the introduction of market price accounting has been discussed in Japan.

Japan's past experience indicates how poorly historical cost accounting performs its task in a period of large volatility in asset prices and how Japan's conventional accounting rules deviated from the world's best practice. The principle of market

price accounting was adopted in Japan from April 2001. Most firms—including those in the financial industry—must evaluate their asset holdings at market price. Less involvement of the MOF in setting accounting rules and the introduction of market price accounting are likely to reduce the possibility that banks succeed in hiding their problems.

5. Conclusion

This paper focuses on the MOF's behaviour during banking crises when there is informational asymmetry between the MOF and outsiders concerning a bank's bad loans. We show that asymmetric information provides incentives for the MOF to cover non-performing loans in order that the MOF may maintain its reputation. The institutional framework, regulatory environment, and economic conditions in the early 1990s all contributed to the MOF's reluctance towards the disclosure of banks' financial troubles. An accounting system that failed to reflect the true financial condition of banks, inexperienced bond rating companies, and sales-oriented securities companies—along with strong economic conditions—all contributed to the creation of an environment in which the MOF did not wish to disclose badly performing loans.

We also analysed the interaction between screening and interim monitoring abilities. The negative association of monitoring ability with screening ability may reduce the cost of truth-telling. An inability to perform interim monitoring may decrease the information about the regulator's type when the outsider observes a bank in trouble. Thus, a regulator that is smart in screening but dumb in interim monitoring might be more likely to report bad loan problems than a regulator who is smart in both screening and interim monitoring. Of course, this is because the regulator cares only about reputation as it relates to screening in our model. If we consider reputation in relation to interim monitoring, the results may be different. The results would also depend on how reputation from screening and reputation from interim monitoring are integrated. In our model, there is no difference in ex post monitoring ability between a good regulator and a bad regulator, but in general, the reputation concern from ex post monitoring is also likely to affect the regulator's behaviour if there is any difference.

Finally, we have examined only the regulator's reputational concern. However, as Eto (1998) and Horiuchi and Shimizu (1999) pointed out, "amakudari"—or concerns regarding post-retirement jobs—also contributed to the bad loan problem. They argue that the MOF was lenient regarding bank-monitoring because MOF bureaucrats feared that they would face a decrease in post-retirement jobs in the financial industry. Strict monitoring may cause restructuring within the banking industry through mergers and acquisitions and, as a result, may lead to a decrease in the number of banks which can accept former MOF officials. Their analysis, however, is not a substitute for our research; in fact, it complements our results. Taking post-retirement job concerns into account, the MOF may be more reluctant to report troubles in banks. Thus, their discussion does not weaken our conclusion but actually strengthens it.

Appendix

p^g *(c: (c,c)) = [(1-h)x+hp]/[x+h(p-x)+h(q-x)]=[(1-h)x+hp]/[(1-2h)x+h(p+q)]*

p^b *(c: (c,c)) =* p^b *(d: (d,d))=(p-x)/[(p-x)+(q-x)]=(p-x)/[p+q-2x]*

p^g *(c: (d,d))=1*

V^c*(h,x,p,q,* p^b *(d: (c,c))=[w/(1-w)] {h[(1-h)x+hp]/[(1-2h)x+h(p+q)]*
+(1-h) (p-x)/[p+q-2x]- p^b *(d: (c,c)}*

V^d *(h,x,p,q)=[w/(1-w)][h+(1-h)*p^b *(c: (d,d))-(p-x)/(p+q-2x)]*

Reference

Abiko, Yuichi (1997), 'A View of Japan's Non-Performing Loans: The current status of disclosure and the effects of taking "Prompt Regulatory Action"', *Monthly Report* Oct 1997, No. 109, Institute for Posts and Telecommunications Policy, The Ministry of Public management, Home Affaires, Posts and Telecommunication, Japan.

Aoki, Masahiko, Hugh Patrick and Paul Sheard (1994), 'The Japanese Main Bank System: Introductory Overview', in *The Japanese Main Bank System: Its relevancy for Developing and Transforming Economies*, edited by Masahiko Aoki and Hugh Patrick, Oxford: Oxford University Press, pp. 3-50.

Boot, A. and A.V. Thakor (1993), 'Self-Interested Bank Regulation'*, The American Economic Review*, Vol. 83, Issue 2, pp. 206-212.

Corbett, Jenny and Janet Mitchell (2000), 'Banking Crises and Bank Rescues: The Effect of Reputation', *Journal of Money, Credit and Banking*, Vol. 32, Issue 3, pp.474-512.

Economic Planning Agency (1993), *Keizai Hakusho (White Paper on the Japanese Economy)*, The Government of Japan.

Eto, Takaharu (1998), "A Simple Model of 'Amakudari' in Japanese Banks" Mimeograph, The Australian National University

Gower, Luke (1996), 'Moral Hazard and Main Bank Monitoring', *Japanese firms,*

Finance, and Markets, edited by Paul Sheard, Addison Wesley-Longman in association with The Australia-Japan Research Centre, The Australian National University.

Horiuchi, Akiyoshi (1998), *Kinyu Sisutemu no Mirai (The future of Financial System)*, 1998, Iwanami Shoten

Horiuchi, Akiyoshi (1999), 'Japan's Bank Crisis: An Overview from Governance Perspective' presented at International Conference, *Reform and Recovery in East Asia: The Role of the State and Economic Enterprises* at Australian National University

Horiuchi, Akiyoshi and Katsutoshi Shimizu (1998), "Did Amakudari Undermine the Effectiveness of Regulator Monitoring in Japan", Discussion Paper Series 98-F-10, The University of Tokyo

Kanaya Akihiro and David Woo (2000), "The Japanese Banking Crisis: Sources and Lessons", IMF Working Paper

Kuroda, Akio (1997), *Kin'yu Kaikaku No Sishin (The Direction of Financial Reform)*, 1997, Toyokeizai Shinposha

Noguchi Yukio (1992), *Baburu no keizaigaku (The Economics of Bubble)*, Nihonkeizai Shinbunsha

Okina, Yuri (1998) Jokaiji to *Nihon no Kin'yi sisutemu (Market Price Accounting and the Financial System of Japan)*, 1998, Toyokeizai Shinposha

Rajan, Raghurm (1994) 'Why Credit Policies Fluctuates: A Theory and Some Evidence', *Quarterly Journal of Economics*, Vol., 109, Issue 2, pp. 399-441.

Scharfstein, David S. and Jeremy C. Stein (1990), 'Herd Behavior and Investment', *The American Economic Review*, Vol. 80, Issue 3, pp. 465-479.

Takao, Yoshikazu (1998), *Kin'yu Dehure (Financial Deflation)*, 1998, Toyokeizai Shinposha