

Creditors' Power in Civil Rehabilitation Law - A Compound Game of a Simple Majority and a Weighted Majority -

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Abstract

This paper investigates creditors' power under Civil Rehabilitation Law in Japan (a similar law of Chapter 11 in the US), which provides reorganization for bankrupt firms in Japan. A civil rehabilitation plan should be approved by unsecured creditors holding at least one-half in amount of unsecured claims and more than one-half in number of unsecured creditors, i.e., the plan is decided by the compound rule of a simple majority and a weighted majority.

We show that, when there are a few large creditors and many small creditors without abstention, each large creditors' power (measured by Shapley-Shubik index) in the compound rule is just half of that in the weighted majority. Namely, Civil Rehabilitation Law is favorable to small creditors and deals large creditors equally. This result is robust even when some small creditors abstain. We also show that the composition act, operated before the civil rehabilitation law, does not have such properties.

Keywords : Compound Game, Weighted Majority, Civil Rehabilitation Law, Shapley-Shubik Power Index, Oceanic Game

JEL Classification Numbers: G33, C71, D72, K29

1 Introduction

In response to increasing bankruptcy filings after 1997, it is passed in 1999 and takes effect on April 1, 2000. **Civil Rehabilitation Law** is a new **debtor in possession (DIP)** procedure, and it provides reorganization mainly for **small and medium-sized enterprises (SMEs)** in economic difficulties, which are expected to continue as a going concern. In practice, however, large Japanese distressed firms also file for bankruptcy under Civil Rehabilitation and more than seven thousand firms have been applied Civil Rehabilitation Law in this ten years. It is well known that General Motors has been applied Chapter 11 bankruptcy, and Chapter 11 in the US corresponds to Civil Rehabilitation Law in Japan.

For filing, it is necessary to pass a plan in the meeting of creditors and to have creditors' approval on cutting claims. Of course, creditors do not like it, but such a partial debt forgiveness will be better than nothing without it. Each creditor has each amount of claim. It is a main issue to fix each creditor's cutting rate, depending on the amount of his claim. We examine the relation of (1) a decision rule for the meeting and (2) the principle of Civil Rehabilitation Law.

On (1), a compound voting rule is used for the approval. Different from the simple one dollar of credit one vote rule, a civil rehabilitation plan should be approved by unsecured creditors holding at least one-half in amount of unsecured claims and more than one-half in number of unsecured creditors. On (2), for the purpose of preventing contagious defaults of SMEs, under Civil Rehabilitation Law, small creditors are entitled strong voting powers. We formulate the compound decision rule in cooperative game framework and measure each creditor's power by a power index. After then, we compare each creditor's power in the compound rule with in the (simple) weighted rule. This analysis will serve to examine whether the purpose of the law is consistent with the voting rule as an operating system.

The decision rule used at creditors meetings to approve civil rehabilitation plans can be formulated as a **compound decision rule** as follows. Each player (creditor) has his/her weight (claim or claim share) and a coalition of players can pass the plan only when the following two conditions are both satisfied: the sum of the weights of the coalition is more

than half of the total weight, and the number of the players of the coalition is more than half of the total number of the players. We consider a power index, **Shapley-Shubik (SS) power index**, in such compound game for each player for a given distribution of weights – face value of each unsecured claims

SS value is a concept of power index which evaluates each player's marginal contribution to various coalitions for passing bills (or proposed plans), and is applied to evaluating power distribution on the United Nation's Security Councils members, analyzing political party's power in a government, and so on. (For example, see Brams, Lucas and Straffin(1983).) Some properties of SS value on a compound game is also known. Peleg (1992) shows that power distribution in a compound game is more egalitarian than in the corresponding simple weighted sum game. Hirokawa and Vlach (2006) shows a stronger result, *that is*, ever difference between two players' indices decreases (strictly speaking, does not increase) in the corresponding compound game, and the result is robust also for the Banzhaf power index though is not for the Deegan-Packel power index.

Here, we focus on a typical case, in which there is a few large creditors and many small creditors. Such a situation is analyzed by Milnor and Sharpley(1978) as the **oceanic game**. They consider that each small creditor is a drop in the ocean and regard a mass of small creditor as an interval. We first show that, in such a limit case, when there is no abstainer, each large creditors' power (measured by Shapley-Shubik index) in the compound rule is just half of that in the weighted majority. Namely, Civil Rehabilitation Law is favorable to small creditors and also deals large creditors equally. Secondly, we also show that this result is robust even when some small creditors abstain. As a comparison, we finally examine the composition act, operated before Civil Rehabilitation Law. We show that law does not have the above properties.

The paper is structured as follows. Section 2 briefly illustrates Civil Rehabilitation Law. In section 3, we introduce our model on power index in a weighted majority an compound majority rule and then in section 4, we examine the power effect of the compound decision rule in a oceanic situation. Also a short analysis for the comparison of Civil Rehabilitation Law and composition act is given. Finally we conclude in section 5.

2 Civil Rehabilitation Law

As a response to the rocketing high increase of bankruptcy after the late 1990s, Civil Rehabilitation Law is passed and it takes effect after April 1, 2000. At the same time, Composition Law was abolished. Small and middle firms sometimes used it. A firm was able to file for Composition only if the firm failed to meet its debt payment obligations. Typically, a firm is viewed to be unable to meet its debt payment obligations if banks dishonor its bills. This condition is equivalent to causes of Liquidation filings. Also, a composition filing should be prepackaged, in other words, the firm had to submit a Composition plan immediately as soon as the firm filing for Composition. Most severely, the court was not authorized to order stay even if it is in need. For the above reasons, Composition filings were extremely rare for large firms.

The passage of Civil Rehabilitation Law has been substantially revising bankruptcy administration in Japan. One aspect is equivalent to Chapter 11 of the US Bankruptcy Code as following: the debtor's management operates the firm and works out a Rehabilitation plan or liquidation, unless an interested party can prove management is incompetent. In a case where the debtor's management is incompetent, Civil Rehabilitation Law provides the appointment of trustee. This debtor in possession aspect of Civil Rehabilitation Law aims to provide incentives for managers of failing firms to file for bankruptcy under Rehabilitation Law by reducing their personal burdens.

The passage of a rehabilitation draft plan requires affirmative votes by only unsecured creditors who are entitled to vote and have attended the creditor meeting and who constitute the majority of attending persons entitled to vote, and at the same hold one half or more of the total amount of unsecured claims in face value. Generally, secured creditors may exercise their rights outside the Rehabilitation procedure. And also the court may give an approval for a person to file a Rehabilitation plan that includes terms for reduction of capital, in case where a rehabilitation debtor company fails to fully meet its payment obligations with its properties. Compared with the passage of a reorganization draft plan, the approval seems simple. Different from Chapter 11 of the US Bankruptcy Code, Civil Rehabilitation Law does not impose automatic stay to protect the firm from

creditors' harassment. Based on application of an interested party, however, the court may, in case where an application for commencement of rehabilitation has been filed, order a discontinuance of exercise of a security right existing on properties of rehabilitation debtor. Moreover, the rehabilitation debtor, may, in a case where collateral properties are indispensable for continuation of business of the debtor, make an application to the court for an approval of extinguishing all the security right on the properties, by paying money equivalent to the market value of the properties to the court. Main features of the Civil Rehabilitation Law are summarized at Appendix A. See Tagashira (2005), Xu (2004; 2005) and Yamamoto (2005) for details.

In this paper, we focus on a unique feature of compound decision making rule of creditors under Civil Rehabilitation Law — a Civil Rehabilitation plan should be approved by unsecured creditors holding at least one-half in amount of unsecured claims and more than one-half in number of unsecured creditors. Intuitively, small creditors are entitled strong powers in such compound rule than in a simple majority rule, but we need a more rigid analysis. Hence we will examine whether the purpose of the law is consistent with the implementation design, by considering power indices.

3 The Model on Power Index in a Weighted Majority and a Compound Majority Rule

In this section, we introduce two games, both with a few large creditors and many small creditors: one is a (simple) weighted majority voting game (W-game) and the other is a compound game (C-game). By comparing each creditor's power in both games, we examine how Civil Rehabilitation Law (corresponding to the C-game) treats creditors.

The W-game is defined as $G = (N, \mathcal{W}, \varphi)$ and the C-game is defined as $G^* = (N, \mathcal{W}^*, \varphi^*)$. Here, $N = N' + N''$ is the set of creditors where $N = \{1, \dots, n\}$ and $N'' = [0, y]$. N' is the set of large creditors and N'' is the set of infinitely small creditors which is given as an interval. Each large creditor $i \in \{1, \dots, n\}$ is endowed his weight x_i ($0 < x_i < 1$). The sum of large creditors' weight $\sum_{i=1, \dots, n} x_i$ is denoted by x . For simplicity we assume $x \leq 1$ and the total weight of all creditors is 1, *i.e.*, $x + y = 1$. \mathcal{W} and \mathcal{W}^* are the set of winning coalitions, *i.e.*, any of which has power for passing the

proposed bills or plans. Formally, let \mathcal{R} be the Boolean ring generated by subsets of N' together with the Lebesgue-measurable subsets of the real interval $[0, y]$. Define a “voting weight” measure u on \mathcal{R} and the sets of winning coalitions \mathcal{W} and \mathcal{W}^* by

$$\begin{aligned} u(S) &= \sum_{i \in S \cap N'} x_i + \lambda(S \cap N''), \\ \mathcal{W} &= \{S \in \mathcal{R} \mid u(S) \geq 1/2\}, \\ \mathcal{W}^* &= \{S \in \mathcal{R} \mid u(S) \geq 1/2 \ \& \ u(S \cap N'') > y/2\} \end{aligned}$$

where λ denotes Lebesgue measure. The first inequality in the definition of \mathcal{W}^* means the weighted majority and the second inequality means the simple majority. Note that each large creditor is measure zero with respect the population. Therefore one half number of creditors is expressed as $y/2$. The last terms of definition of both games, φ and φ^* , are the Shapley-Shubik (SS) value of the games. SS value indicates each creditor’s marginal contribution to various winning coalition formations.

In order to fix each creditor’s SS value, (1) consider any possible ordering of all creditors and (2) examine whether that creditor can be a **pivotal creditor** in each ordering, *i.e.*, examine whether the set of his predecessors can be a winning coalition only after he joins. SS value is obtained as the probability of each creditor’s pivotal possibility in all ordering of all creditors. On (1), we can avoid the difficulty of re-ordering the continuum creditors because of the symmetry and have only to insert large creditors into $[0, y]$, in which small creditors have previously been ordered in some fixed way. On (2), each small creditor cannot be a pivot by the assumption. First we define SS value for each large creditor and then consider small creditors’ value as the mass.

Assume that small creditors stand in line $[0, y]$ and each large creditor i decides a point $y_i \in [0, y]$ as his entering timing to form a coalition. The set of large predecessors of i is denoted by $P(i) = \{j \mid x_j \leq x_i\}$.

A large creditor is pivotal in the weighted voting if and only if the sum of weights of predecessors reaches $1/2$ only after that creditor joins. Therefore, the SS value of large creditor $i \in N'$ in the W-game, φ_i , is the probability that the timing vector $(x_1, \dots, x_n) \in [0, y]^n$ satisfies the following condition:

$$\sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i.$$

The SS value of small creditors, φ_s , is obtained as a mass weight by subtracting all large creditors' SS values from total values, *i.e.*, $\varphi_s = 1 - \sum_{i \in N'} \varphi_i$.

Note that even a large creditor is measure zero with respect the population. Total population is y and the population of creditor i 's predecessors is expressed by his entry timing, y_i , which is not changed after i enters. Hence, the SS value of large creditor $i \in N'$ in the C-game, φ_i^* , is the probability that the timing vector $(x_1, \dots, x_n) \in [0, y]^n$ satisfies the following condition:

$$\sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \quad \text{and} \quad y_i > y/2.$$

The SS value of small creditors in the C-game, φ_s^* , is obtained in the same way as in the W-game, *i.e.*, $\varphi_s^* = 1 - \sum_{i \in N'} \varphi_i^*$.

Without a mass of small creditors, the C-game is more favorable to “relatively small” large creditors than the W-game. In fact, every power difference between creditors in the W-game decreases (strictly speaking, does not increase) in the compound game. More formally,

Power Shift Theorem 1 (Hirokawa and Vlach (2006))

Let $x_1 \leq x_2 \leq \dots \leq x_n$. If $i > j$ for $i, j \in N'$ then $\varphi_i^* \geq \varphi_j^*$ and $\varphi_i^* - \varphi_j^* \leq \varphi_i - \varphi_j$.

On the proof, see Hirokawa and Vlach (2006). There also exists a similar theorem though that one is a weaker result than ours:

Power Shift Theorem 2 (Peleg (1992))

If $x_1 \leq x_2 \leq \dots \leq x_n$, then $\sum_{k=1}^i \varphi_k^* \geq \sum_{k=1}^i \varphi_k$ for $i = 1, \dots, n$.

This asserts that the compound voting is more egalitarian than the simple-weighted majority voting in **Gini** sense. In any case, the compound game is favorable to a small player than a large player. In this paper, we examine how these results change when there is a mass of small creditors.

4 Power Shift in Oceanic Situation

First, we examine the case of one large creditor i and a mass of small creditors as a preliminary exercise and then we consider more general cases.

4.1 Case 1: one large creditor and a mass of small creditors

Let the share of the large creditor be x and the share of small creditors be y ($x + y = 1$). We will show that if there is no abstainer, the SS value of the large creditor in the C-game is just half of that in the W-game, *i.e.*,

Theorem 1

Assume that there is no abstainer. Then, $\varphi_i^* = \varphi_i/2$.

Proof We divide the proof in two sub-cases according to the size of x : (1) $x \geq 1/2$ and (2) $x \leq 1/2$.

(1) Let $x \geq 1/2$. In this case, the large creditor is a pivot for any entry timing in the W-game. Hence $\varphi_i = 1$ and $\varphi_s = 1 - \varphi_i = 0$. In the C-game, in order to be a pivot, the large creditor should enter to a mass of small creditors at $y/2$ or after. Therefore $\varphi_i = (y/2)/y = 1/2$ and $\varphi_s = 1/2$.

(2) Let $x \leq 1/2$. In this case, the large creditor is a pivot in the W-game if and only if $x \in [1/2 - x, 1/2]$. Hence $\varphi_i = x/y$ and $\varphi_s = 1 - x/y$. In the C-game, since at least a half number of creditors are needed to form winning coalition, in order to be a pivot, the large creditor should enter to a mass of creditors at some point in $[y/2, 1/2]$. Therefore $\varphi_i = (1/2 - y/2)/y = (1 - y)/2y = x/2y$ and $\varphi_s = 1 - x/2y$.

In any case, we have the required result. \square

4.2 Case 2: multiple large creditors and a mass of small creditors

Next consider the case where more than one large creditors exist. We again obtain the similar result.

Theorem 2

Assume that there is no abstainer. Then, $\varphi_i^* = \varphi_i/2$ for all $i \in N''$.

Proof Let the large creditor i 's share be x_i such that $0 < x_i < 1$ and $\sum_{i \in N'} x_i < 1$. We regard the entry timing of large creditor i as a point y_i in a mass of creditors $[0, y]$. Consider a tuple of entry timings of creditor 1 through $n - 1$, denoted by $y_{-n} = (y_1, \dots, y_{n-1}) \in [0, y]^{n-1}$, and define f as follows:

$$f : [0, y]^{n-1} \rightarrow [0, y]^{n-1}; (y_1, \dots, y_{n-1}) \mapsto (y - y_1, \dots, y - y_n)$$

Remark that f is bijection. First we show the following result.

Lemma Fix an entry timing $E = (y_1, \dots, y_{n-1})$ such that $y_1 \leq \dots \leq y_{n-1}$ and let $E' = f(E)$. Then we have

$$\begin{aligned} & 1/2[Prob\{y_n \in [0, y] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \text{ for } E\} \\ & + Prob\{y_n \in [0, y] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \text{ for } E'\}] \\ & = Prob\{y_n \in [0, y] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \ \& \ y_n \geq y/2 \text{ for } E\} \\ & \quad + Prob\{y_n \in [0, y] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \ \& \ y_n \geq y/2 \text{ for } E'\}. \end{aligned}$$

Proof for Lemma For simplicity, let $P_n([0, y_1], W, E) = Prob\{y_n \in [0, y_1] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \text{ for } E\}$ and let $P_n([0, y_1], C, E) = Prob\{y_n \in [0, y] \mid \sum_{j \in P(i)} x_j + y_i \leq 1/2 \leq \sum_{j \in P(i)} x_j + y_i + x_i \ \& \ y_n \geq y/2 \text{ for } E\}$. $P_n([0, y_1], W, E')$ and $P_n([0, y_1], W, E)$ are similarly defined. We have only to show that

$$1/2[P_n([0, y_1], W, E) + P_n([y_{n-1}, y], W, E')] = P_n([0, y_1], C, E) + P_n([y_{n-1}, y], C, E').$$

We divide the proof in two sub-cases: (1) $P_n([0, y_1], W, E) = 0$ and (2) $P_n([0, y_1], W, E) \neq 0$.

(1) If $P_n([0, y_1], W, E) = 0$, since there is no chance that the creditor n is pivotal in $[0, y_1]$ in the W-game, the sum of the large creditor n 's share and small creditors share in $[0, y_1]$ is less than $1/2$. Hence $x_n + y_1 < 1/2$. By this inequality, we have $(y - y_1) + \sum_{i \neq n} x_i = y - y_1 + x - x_n = 1 - y_1 - x_n > 1/2$. This implies that there is no chance that the creditor n is pivotal in $[y_{n-1}, y]$ in the W-game and $P_n([y_{n-1}, y], W, E) = 0$.

Also note that $P_n([0, y_1], W, E') \leq P_n([0, y_1], W, E) = 0$ and $P_n([y_{n-1}, y], W, E') \leq P_n([y_{n-1}, y], W, E) = 0$. Hence we have the required result.

(2) When $P_n([0, y_1], W, E) \neq 0$, let the range in which n is pivotal in $[0, y_1]$ in the W game with respect to E be denoted by $[z, z']$. The range in which n is pivotal in $[y_{n-1}, y]$ in the W game with respect to E' is $[y - z', y - z]$. Hence, $P_n([0, y_1], W, E) = P_n([y_{n-1}, y], W, E') = (z' - z)/y$

Now consider $P_n([0, y_1], C, E)$ and $P_n([y_{n-1}, y], C, E')$. We examine two sub-cases: (i) $[z, z'] \cap [y/2, y] = \emptyset$ and (ii) $[z, z'] \cap [y/2, y] \neq \emptyset$.

(i) When $[z, z'] \cap [y/2, y] = \emptyset$, $z' < y/2$, which implies that $y - z' > y/2$. Hence $|[y - z', y - z] \cap [y/2, y]| = (z - z')/y$ and we obtain $P_n([0, y_1], C, E) + P_n([y_{n-1}, y], C, E') = (0 + (z' - z))/y = 1/2[P_n([0, y_1], W, E) + P_n([y_{n-1}, y], W, E')]$.

(ii) When $[z, z'] \cap [y/2, y] \neq \emptyset$, $|[z, z'] \cap [y/2, y]| = z' - y/2$ and $|[y - z', y - z] \cap [y/2, y]| = (y - z) - y/2 = y/2 - z$. Again we obtain $P_n([0, y_1], C, E) + P_n([y_{n-1}, y], C, E') = (z' - z)/y$. This implies the required result. \square

Note that this lemma is robust for any entry timing $E = (y_1, \dots, y_{n-1})$ and $E' = f(E)$. Since f is bijection, we have that the large creditor n 's probability of pivot in the C-game is half of that in the W-game. This lemma is applicable for any $y_{-i} = (y_1, \dots, y_{i-1}, y_{i+1}, \dots, y_{n-1})$ and $f(y_{-i})$ and therefore we obtain that for any large creditor, his probability of pivot in the C-game is half of that in the W-game. \square

From this theorem, we have:

- Each large creditor *equally* lose his power in the C-game, compared with in the W-game. This result is independent from the share of large creditor. And the amount of the loss is added to small creditors.
- This result is robust even if some of small creditors abstain. Therefore this power shift result is *not changed by abstention*.
- Hence, Civil Rehabilitation Law cuts large creditors power in a very fair way in the typical cases.

Finally we compare Civil Rehabilitation Law with Composition Act, operated before Civil Rehabilitation law. In Composition Act, to pass a bill, we need 3/4 share of claims and 1/2 numbers of creditors. Under this rule, some large creditors lose his power drastically. For example, let $x_1 = .6, x_2 = .1$, and $y = 0.3$. Then, we have $\varphi_1^* = .5, \varphi_2^* = 0$. This is extremely unfavorable to the large creditor 2.¹ This large creditor 2 can be regarded as a medium creditor. With a large creditor, this medium creditor's power is vanished (and same as a small creditor's one) under Composition Act. Such an extreme vanishment does not occur under Civil Rehabilitation Law.

I am not sure the planners of the law intend this result, but Civil Rehabilitation Law has a nice property.

5 Concluding Remarks

After the passage of Civil Rehabilitation Law, it has been the most frequently employed reorganization procedure for corporate reorganization. In recent insolvency practice, Rehabilitation plan are often favorable to small creditors, since a Civil Rehabilitation plan should be approved by unsecured creditors holding at least one-half in amount of unsecured claims and more than one-half in number of unsecured creditors, different from the simple one-claim-one-vote rule.

As a collateral evidence, we show a real case on Sato-Hide, a construction company in Japan. Sato-Hide filed for Civil Rehabilitation on June 10th, 2004. Tokyo Shoko Research (TSR) Information provides detail of information on Civil Rehabilitation plans as well as on creditors. It attempts to reorganize sponsored by Sakusesufakutori (owned by owner manager MR YASUKAWA, Hidetoshi of Goldcrest listed in the 1st section of

¹ Let the entry timing of the creditor 1 (*resp.*, 2) be y_1 (*resp.*, y_2).

We examine the entry timing when the creditor 1 is pivotal, taking into consideration of $y_2 \in [0, 30]$. In the W-game, the creditor 1 is pivotal if (i) $5 \leq y_1 \leq 30$ for y_2 such that $0 \leq y_2 \leq 5$ and (ii) $y_2 \leq y_1 \leq 30$ for y_2 such that $5 \leq y_2 \leq 15$ and (iii) $15 \leq y_1 \leq 30$ for y_2 such that $15 \leq y_2 \leq 30$. Hence, $\varphi_1 = 1/6 \times 5/6 + \int_{1/6}^1 (1-y)dy + 1/2 \times 1/2 = 53/72$. In the C-game, the creditor 1 is pivotal if $15 \leq y_1 \leq 30$. Hence $\varphi_1 = 1/2$.

Similarly, examine the entry timing when the creditor 2 is pivotal, taking into consideration of $y_1 \in [0, 30]$. In the W-game, the creditor 2 is pivotal if (i) $5 \leq y_2 \leq 15$ for y_2 such that $0 \leq y_1 \leq 5$ and (ii) $y_1 \leq y_2 \leq 15$ for y_2 such that $5 \leq y_1 \leq 15$. Note that there is no chance for the creditor 2 to be pivotal when $15 \leq y_1 \leq 30$. Hence $\varphi_2 = 1/6 \times 1/3 + \int_{1/6}^{1/2} (1-y)dy = 5/18$. In the C-game, there is no chance for the creditor 2 to be pivotal and $\varphi_2 = 0$.

Tokyo Stock Exchange. After a 100% reduction of capital, Sato-Hide issued stocks to Sakusesufakutori and repay all debt at one time according to its Rehabilitation Plan. Tokyo District Court confirmed the plan on November 17th, 2004. It is typical that old shareholders lose anything in Civil Rehabilitation.

From the TSR document, there are a few large creditors (each of whose claim is more than 100 million yen = about 10,000 US dollars) and many small creditors. Moreover, Sato-Hide has 392 unsecured creditors and each of other creditors has only unsecured claims of 3 million yen or less though we cannot see their exact amount. We estimate the claim of latter creditors 1.5 million yen, then the top six largest unsecured creditors' fraction is 23.08%. and 696 unsecured creditors' fraction is 76.92%. In the TSR document, we can also see the (actually applied) recovery plan, in which the recovery rate is: (i) 100% if a creditor's amount of claims is less than 1 million yen, and (ii) marginally 1% if the amount of the claim is beyond 1 million yen. As a result, a large creditors only gets about 1% of the amount of claims while a small creditor gets high return. Also we see that large creditors' claim are cut uniformly. This fits our result. We, however, need more empirical analysis and it is our next work.

In this paper, we develop a compounding decision rule game and theoretically show power shift by considering SS value in an oceanic situation.

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Appendix: Main features of Civil Rehabilitation Law

1. The firm continues as a going concern.
2. The debtor management continues to take the control (debtor in possession), unless the debtor management is incompetent, for instance, management frauds. And the court may appoint receivers in case of the incompetence of the debtor management based on an application of an interest party.
3. The court may order a discontinuance of exercise of a security right existing on properties. And in a case where collateral are indispensable for continuation of business, the rehabilitation debtor may make an application to the court for an approval of extinguishing all the security rights on the properties, by paying money equivalent to the market value.
4. Unsecured creditors approve a rehabilitation plan. Generally, secured creditors may exercise their rights without following the rehabilitation proceedings. And capital may be reduced without shareholders' approval in case where the rehabilitation company fails to fully satisfy its obligations with its properties.