

The Study of Decision-Making Model on Small and Medium Sized Management States of Financial Agencies and Monitoring Progressive Insolvency : Case of Mutual Savings Banks

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Abstract

This paper studies small and medium sized financial agency's management states that take advantage of the Korea Federation of Saving Bank's data. It also presents the management state and the decision-making model that monitors progressive insolvency by standardizing transfer path between relevant groups. With this in mind, we extracted explanatory variables for predictions of insolvency by using existing studies of document related insolvency. First of all, we designed a state model based on demarcated groups to take advantage of the self organizing map that groups in line with a neural network. Secondly, we developed a transition model by standardizing the transfer path between individual banks in a state model. Finally, we presented a decision-making model that integrated the state model and the transition model. This paper will provide groundwork for methods of insolvency prevention to businesses in order for them to have a smooth management system in the financial agencies.

Keywords : Saving Bank, Insolvency, PTSM, SOM

1. Background and objective

1.1 Background

The financial agency's health is an essential element that provides a stable banking service. Therefore, the Financial Supervisory Service executes various system checks such as assessing actual conditions of a management. However, it only focuses on the system's financial agency such as banks and stock companies. Before this, there was a united interest and support for the system's financial agency but interest and support for small and medium sized financial agencies such as mutual saving banks was low.

During IMF time, there were social damages because 115 insolvent mutual savings banks were liquidated and public funds of 8500 billion wons (USD 8.5 billion) were injected. Mutual savings bank is an ever-present danger of insolvency or bankruptcy from peculiar environments (Small capital, a credit loan, number of customers) of small and medium sized financial agencies. These banks are more inferior than commercial banks since research plans or decision-making models are not well developed or solid.

To manage mutual savings banks, decision-making for liquidation or support must be correctly made. However, existing studies show decision-making processes for circumstances of insolvency progress [Yun, 2006, Yun, 2002, Min, 2001] liquidation, and support [Bae, 2006, Park, 2005, Lee, 2004] separately.

Therefore, a verified decision-making model that can monitor management states or insolvency progress and forecast it is necessary for an effective administration of mutual savings banks.

1.2 Objective

When compared with a first finance authority, decision-making models of mutual savings banks are inferior and so change in the business environment was advocated. So in this study, we developed the Predictive State Transition Model (PSTM) which is a decision-making model.

PSTM's development purpose are monitoring and predicting management states or insolvency progresses, making decisions about supporting or liquidating based on the monitoring, and predicting the results (management state or insolvency progress degrees).

If the PSTM is to be developed from this study, it can forecast transfer or change of management states as well as evaluate present management states of mutual savings banks. Also, we can execute a policy that can raise the health of mutual savings banks by strengthening the supervisor and support. This can be done if mutual savings banks enter the transfer routing line that prognosticate an aggravation of management states or insolvency progress. Through this, we can minimize the customer's and social damage caused by failure of the bank.

2. Study the documents

2.1 Estimation of insolvency

This paper obtained study viewpoints by selecting the best methods of decision-making about insolvency availability. In this study, we try to look for the most superior method by looking at the results of preceding studies that deals with the estimation of insolvency.

Bae and Kim [2006] presented a model that combined the artificial intelligence method and the statistical method in order to estimate the enterprise's wrong doings [4]. With this in mind, we verified that the multi-variate discriminant analysis, the logistic regression analysis and the neural network had been used the most among statistical models.

Kim [2004] compared an estimated accuracy of the enterprise's wrong doings between a neural network method and a discriminant analysis method [10]. So he presented a study that looks at the synthesis comparison of the estimated result, the propriety measure analysis of pattern recognition, and the neural network method. All of these methods are part of the decision-making support system.

Lee [2002] conducted a study about the technique of wrong doings estimated to take advantage of the neural network [11]. This study referred to Lee's Back Propagation (BP) Network where there was practical use in the process that applies mutual savings bank's proof data to the neural network.

Yun and Hwang [1999] presented the alternative method which was the standardized judgment method of non-financial measures.

The purpose of this method was to develop an enterprise bankruptcy prediction model using the neural network [12]. This study produced useful results where the estimate model integrated non-financial measures rather than using existing financial ratio measures.

Cho [1997] applied the neural network that set the prices of financial derivatives [13]. In this paper, we referred to the process (application of multi-layered neural network structure) which applied to the neural network.

Kim [2004] presented a data mining method that reduced mass data to optimum data in the process that applied neural networks in order to produce the enterprise's failure estimation [14]. This paper referred to Kim's study which found the data process that applied the proof data of mutual savings banks to the neural network.

2.2 Self-Organizing Maps (SOM)

Traditionally, statistical series techniques such as K-Means have been used mostly by a tool that analyzes and assorts the enterprise's multidimensional outcome. However, the normality problem of the basic data and the problem of bulky data processing were presented as shortcomings. To conquer this problem, methods which are a series of neural network techniques where the SOM is representative method are used. This method can easily solve problems by finding the normality assumption of basic data and the suitable function form of distribution through the study of the neural net. Also, it produces excellent

results which visualizes the individual enterprise's position.

Yoon, Choi and Wang [2002] suggested the Hybrid SOM algorithm that combines the stochastic distribution with self-regulating neural net [16]. They used the self-regulation neural net and the stochastic distribution to trigger the construction and maintenance of the knowledge base for a faster and more intelligent management of the project.

Min and Lee [2001] suggested the possibility of a self-organization map by using the differentiation cluster model [23]. They confirmed the enterprise's position visually by prescribing a special quality in each cluster.

Kim and Lee [2003] presented an access method that integrated single matrixes by using the alternative method to overcome the limitation of a single model [17].

Back [2003] studies showed that some things can go wrong by using the hybrid data based on the process data collected from manufacturing systems. The study also produced the intelligence disorder diagnostic system that can diagnose an occurrence availability of irrational circumstance to present the current process state.

Jun [2007] introduced the "Inconsistency pattern model" which was a new hybrid and it combined the model by using the method which improved the performance of the guidance studying technique. Also, this method applied to various aggregates of data and showed that the performance was improved when compared to a single technique or a similar combined technique [20].

2.3 The insolvent estimate of mutual savings bank

The paper concentrated on a viewpoint of study that explores the explanatory variable for Insolvent estimate. We collected the explanatory variable data of this study via preceding study related to the mutual savings bank.

Kim [2002] considered the variable of financial measures about the management's actual conditions where it was enforced by the supervisory office. The governance special variable was measured by financial measures of the dummy variable [1]. He extracted a total of 25 explanatory variables and raised the pliability for the abstraction area of the variable by considering various explanatory variables except for the financial measure where there was forecast insolvent of the mutual savings bank.

Nam and Jin [1998] studied the effect of laying stress on the financial measure variable of the management condition estimation for mutual savings bank which was enforced at the supervisory office [2]. This study adds some important financial ratios besides the financial measure that is used in the management's condition estimation and used a total of 28 metric indices and 1 non-metric index.

Yoon [2006] chose a financial ratio explanatory variable related to the asset and analyzed relationships. The relationship was a rapid increase mechanism associated with the insolvent of mutual savings bank through case studies of four mutual savings banks[3].

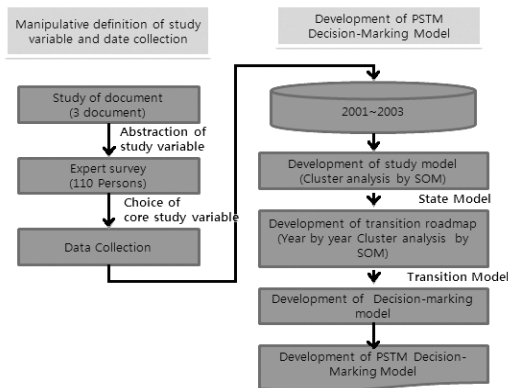
He considered the early warning pattern for an insolvent financial agency.

3. Method and process of study

We will develop a decision-making model (Predictive State Transition Model) which will achieve the purpose of this study which is to develop a decision-making model that can monitor the management state and the insolvent progress degree for mutual savings banks.

The detailed study process is depicted in the following <Table 1>. First, we develop a state model (State Model) which will standardize a cluster of mutual savings bank management state according to the core study variable. We will also develop a state transfer model (State Transition Model) which will produce a roadmap since it can forecast the transition of the management state in the state model.

In this study, the PSTM model develops a cluster by the core study variable - a roadmap that displays the management state and as time goes by a state transition. In other words, it means to model a state and state transition by a cluster analysis. The actual proof data of the period assumed that there were a lot of management state transfers of mutual savings bank for developing an optimum decision-making model that displayed the state and the state transitions of mutual savings



<Figure 1> Method and process of study

<Table 1> explanation of the process

Development procedure of study model		Method	Description
1. Operational definition of study variable	1.1 Abstraction of study variable	Study the document	Abstractions of 17 explanatory variable from preceding research paper
	1.2 Abstraction of core study variable	Survey	Survey to expert of banking supervisory office and mutual savings bank and abstraction of 4 core study variables
2. collecting data	2. collecting data	collecting data	About internal mutual savings banks to 203 in 2007 from 1999, collect a data related study variable
3. developing decision-making model (PSTM)	3-1 developing a study model (State Model)	Analysing a cluster	Developing study model uses SOM to core study variable data of mutual savings bank in 2001 and study SOM.
	3-2 developing a transition roadmap (Transition Model)	In the order of the year : analysing a cluster	Analysing core study variable data from 2001 to 2003 through SOM that is studied by study variable data in 2001 and developing a transition roadmap among cluster

bank.

We simulated the SOM for its data from 1999 to 2001. From 1999, it was displayed that the state transition of the management state (state) was for the PSTM model's development but it was lacking the source data and the width of the management state. Also, the change exceeded the accepted degree in the study. Therefore, we chose a cluster analysis data to actual proof data during the 3 years to get it to become relatively stable.

4. Findings

4.1 Abstraction of the core study variable

We chose a total of 17 explanatory variables that display the management state or the insolvent degree of financial industry by observing and analyzing the document for the preceding study paper which is depicted in <Table 2>.

We carried out an expert survey to extract the core study variable that displays the management state and the insolvent degree of mutual savings bank in order to study the variable that was finally chosen from the study. The expert survey was conducted to a total of 110 people like the banking supervisor agency's experts, the administrator of mutual savings bank, and the expert group. The survey's participants were divided out into the following categories :

- People responsible for banking the supervisor's mutual savings bank : 17 people
- People responsible for more than the section head in Korea Federation of Saving Banks : 13 people
- People responsible for the business management in the individual mutual savings bank : 80 people

We composed a questionnaire with 17 study

<Table 2> 17 explanatory variables that are selected by studying the document

variables An author	credit an increasing ratio	operating revenue increasing ratio	fixed assets ratio	equity capital ratio	current ratio	ROE	ROA	account ratio	ROI
Joo-Ha Nam (2002)	⊙	×	⊙	×	⊙	⊙	⊙	⊙	⊙
Young-Ki Kim (1998)	⊙	×	⊙	×	⊙	⊙	⊙	⊙	⊙
Jae-Ho Yoon (2006)	⊙	×	⊙	×	⊙	⊙	⊙	⊙	⊙
CAMEL (2000)	⊙	⊙	⊙	⊙	⊙	⊙	×	⊙	×
variables An author	current assets ratio	NPL ratio	Net income	Total asset scale	Investment securities	ROA	Total asset expense rate	Core deposit	
Joo-Ha Nam (2002)	⊙	⊙	⊙	⊙	⊙	⊙	x	x	
Young-Ki Kim (1998)	⊙	⊙	⊙	x	x	⊙	x	x	
Jae-Ho Yoon (2006)	⊙	⊙	⊙	⊙	⊙	x	x	x	
CAMEL (2000)	x	⊙	x	x	x	x	⊙	⊙	

<Table 3> Result of survey

Variable	Mean
NPL ratio	4.31
Net income	3.98
Equity capital ratio	3.89
Credit an increasing ratio	3.81
Current ratio	3.27
ROA	3.26
Account ratio	3.24
ROA	3.21
ROI	3.15
ROE	3.12
Operating revenue increasing ratio	3.07
Current assets ratio	3.02
Investment securities	2.97
Fixed assets ratio	2.91
Total asset expense rate	2.88
Total asset scale	2.82
Core deposit	2.82
Total Mean	3.28

variables that were chosen through the study and made up questions about the importance of displaying the management state and the insolvent degree of mutual savings bank in a 1~5 point scale. We conducted the survey through letters and telephone communication and the question recovery percentage was 100%. The mean value of importance of 17 study va-

riables was 3.28 according to results of the survey. We chose a core study variable which was a higher study variable 4 rather than the mean value of importance of the individual study variables that experts evaluated <Table 3>.

The point study variable is expected to be used in the cluster’s formation and by observing the cluster analysis as a minimal set, the management state and the insolvent progress degree of mutual savings bank can be understood. The manipulative definition about the individual core study variable is as of the following <Table 4>.

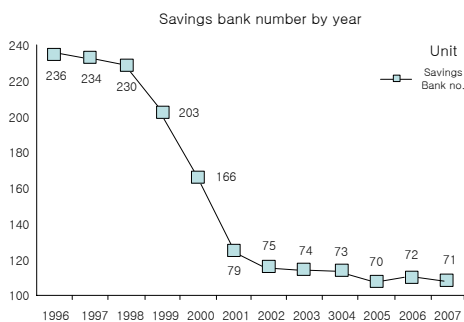
4.2 Collecting data

The collected actual proof data of all domestic mutual savings banks for the development of the decision-making model was the product of this study for the management state and monitoring the insolvent progress of the mutual savings bank. This data had 17 study variables from 1996 to 2007 for all of the domestic mutual savings banks. The character-

<Table 4> Manipulative definition of 4 point study variable

Core study variable	Meaning	Expected role in study model
NPL ratio	Value that NPL divided by the total credit	<ul style="list-style-type: none"> ◦ Integrity grasping of the credit ◦ Factor of management aggravation by augmentation of non-profitability property (If it is higher than average, it needs an active liquidation.)
Net income	Remains share that deducts total cost in gross profit that receive given period	Grasp a result of business (If it is lower than average, it needs a strengthening of business.)
Equity capital ratio	The ratio that represents how much owner’s share among total assets	Grasping whether or not the stockholder’s capital expansion (If it is lower, it needs an increase of capital.)
Credit an increasing ratio	Increase rate of total credit compared with the previous year	Grasping of financing form (If higher than average, it is offensive. If average, it is conservative. If lower than average, it is negative.)

istics of the collected data is as of the following. First of all, the mutual savings bank which amounted to 236 in 1996 was left with 151 from 1998 to 2001 by the aftermath of the IMF. Secondly, the present 71 mutual savings banks are operated because the business environment of the mutual savings bank stabilized from 2001. The collected data was used where it chose the optimum standard period (2001) to use SOM in order to carry out a preliminary simulation 5 times. We used an actual proof data from 2001 to 2003 for modeling that transfer among the business status as time went by <Figure 2>.



<Figure 2> Change of mutual savings bank number by year

4.3 Development of decision-marking model

(1) State model

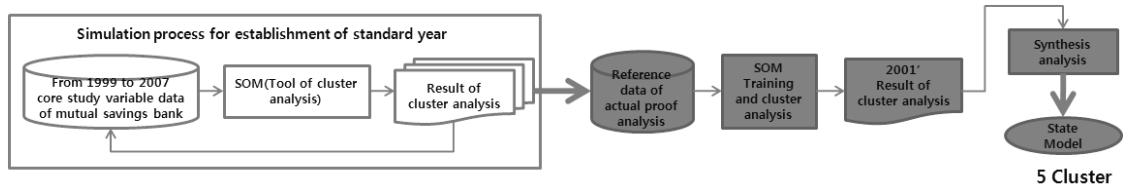
The state that carries out a cluster analysis of the actual proof data of mutual savings bank and displays the management state is a state model is suppose to do. We carried out a cluster analysis for the state model's development and result was as of the following. First of all, we used the SOM to obtain actual proof data of mutual savings bank and

simulated the cluster analysis several times. With the result that we found, that data from 1999 to 2000 was not proper according to the study model. This result disproved that change in the business status was extreme since the IMF was in a serious state about the fraudulent accounting information. Secondly, we conducted the study with the SOM (which is a cluster analysis tool) that chose the actual proof data from the standard data in 2001 through a preliminary simulation. We took advantage of the SOM's result and analyzed the cluster by order and by year which looked at the actual proof data of mutual savings bank from 2001 to 2003. The cluster analysis tool used the software package Nenet 1.1 version that made the Self-Organizing Maps.

1) The development process of the state model

Classified to the maximum cluster, the SOM package permitted the study target data to be 2001 and was set by the standard period. It achieved a $(10 \times 10 = 100)$ cluster by studying and training. The investigator estimated the result of the cluster analysis and properly re-established the parameter while executing the simulation several times. 2001 was the chosen year by the optimum state model's creation basic period. It studied the actual proof data in 2001 because it used the SOM on the basis of these results and produced the state model <Figure 3>.

We conducted training to use the SOM with the study target data which was 2001 and after the first cluster analysis, we classi-



<Figure 3> Process of development of state model

fied 83 clusters as the result. We synthesized and analyzed the map that integrated 4 variables, expressed the special quality of the cluster by 4 study variables, and estimated the result of the cluster analysis. The result re-established the parameter when it executed the cluster analysis several times, we obtained 5 cluster results.

2) Result of the state model development

Because the investigator evaluated 5 clusters according to the cluster analysis result, the change in the state model was deduced (<Table 5> and <Table 6>).

The state model's 5 clusters are expressed at maximum, minimum and mean values at 4 point variables. It produced 5 individual clusters on the basis of the produced value <Ta-

ble 6>.

Through the state model, 5 clusters were presented and were classified by the stable groups (A, B, and C) and the unstable groups (D and E). It could not express superiority or inferiority of the three stable groups and deciding the direction according to the individual enterprise's management target and strategy was important. The two unstable groups should require passive direction and supervision. They should conduct decision-making about liquidation availability according to state afterwards.

(2) Transition model

In this study, we defined the transfer model where if the specification bank was located in one of the model's 5 clusters, this bank will

<Table 5> State model's 5 cluster

Year of 2001		Core study variable											
		Credit an increasing ratio			Equity capital ratio			NPL ratio			Net income		
state	No of bank	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
A	31	26.01	2.55	14.19	10.99	7.80	9.47	17.35	9.95	14.28	1990.37	-1188.8	162.18
B	14	3.85	-28.93	-9.01	14.51	7.96	11.62	37.98	14.05	27.00	6299.01	-8152.9	-2804.9
C	13	53.32	35.19	42.85	9.42	5.85	7.56	34.02	20.09	26.33	-896.60	-4732.1	-3016.4
D	7	26.50	7.74	17.53	7.62	4.77	6.80	30.27	10.98	20.43	2820.17	-13591.	-4392.4
E	14	-3.36	-12.07	-7.69	7.31	4.87	6.49	42.72	31.54	36.56	-25148.	-40421.	-33033.
Total/ Mean	79	53.32	-28.93	11.38	14.51	4.77	9.16	42.72	9.95	23.27	6299.01	-40421.32	-4340.72

〈Table 6〉 Characteristic by state model's cluster and decision-making measure

Group		Characteristic	Measure
A	Group of sound	<ul style="list-style-type: none"> ◦ Group with non-live assets is relatively smaller than other savings bank. ◦ live assets are measured by delay credit's total more than 6 months and that is relatively low. This means that it is higher in integrity than other savings bank. 	<ul style="list-style-type: none"> ◦ Must increase credit by passive business if growth is intended. ◦ Must enforce capital increase if stabilization is intended.
B	Group of stability	<ul style="list-style-type: none"> ◦ Group with high stability because owner's share among the total assets are higher than the savings bank which is relatively different. 	<ul style="list-style-type: none"> ◦ If integrity is intended, they must actively reduce long-term delay credit that more than 6 months. ◦ If growth is intended, they must raise credit increase rate through active business such as development of new loan goods.
C	Group of growth	<ul style="list-style-type: none"> ◦ Group with a high increase rate compared to the previous year by sale rise of loan goods has growth power is secured. ◦ Possibility of growth is high, but management state can be worsened if secured credit is exposed with long-term delay for more than 6 months. 	<ul style="list-style-type: none"> ◦ If stabilization is intended, they must enforce a capital expansion. ◦ If integrity is intended, they need an active curtailment of delay credit for more than 6 months.
D	Group of poor	<ul style="list-style-type: none"> ◦ Because state of core variable is generally low, group with management ability that can display healthiness, stability, and growth is weak than other savings bank. 	<ul style="list-style-type: none"> ◦ Entry attempt of the stability group by target, they establish detailed action plan to realize capital expansion and fulfill this. ◦ They need the special countermeasure that can prevent core variables more than serious aggravation.
E	Group of threat	<ul style="list-style-type: none"> ◦ Group has high possibility for failure more than other savings bank and management state is worsened 	<ul style="list-style-type: none"> ◦ They should be considered for a special revival countermeasure through the professional institution's inquiry. ◦ If it is impossible, they should do decision-making for liquidation availability.

standardize to the target group where transition will be possible the next year.

By executing training from 2001 for the standard period, the transfer model's development and the executed cluster analysis from the training result from 2001 to 2003 will be formed. Keeping track of transfers between clusters as time goes by will produce transfer paths once analysis of the cluster analysis results are finished. The target data for the cluster analysis used data for 2003 from 2001

that changed the management state of the mutual savings bank. Then it entered a stable state and a cluster analysis tool used the software package Nenet 1.1 that made the self-organization map as the state model. The final transfer result was modified by Microsoft Excel and the program adjusted the result.

1) Process of development for the transition model

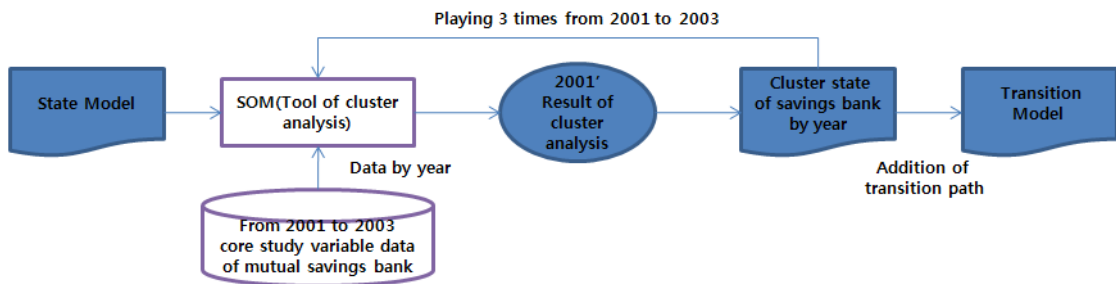
We applied the target data from 2001 to 2003

to the SOM and executed the training by 2001 (standard period) and classified the cluster by the experiment's result from 2001 to 2003 through a training result. We grasped the cluster state of each savings bank to the cluster result in 2001. Also, we added a change of state in an already developed study model (State Model) from <Figure 4>. The purpose of this was to integrate the existing state model to the transfer model (PSTM model) which were present in this study.

2) The result of the development for the transition model

The transfer model is expressed in the path that it moved during the 2 years in the previous state model and this is the PSTM model's component <Table 7>. All of the numbers that are on top in each box are the number of banks. The second numbers below the first numbers in each box are in percentage.

To express a transfer route according to



<Figure 4> Process of development of transition model

<Table 7> Expression of path that integrate state model and transfer model

2001		2002							2003					
state	No of bank	A	B	C	D	E	liquid ation	No of bank	A	B	C	D	E	liquid ation
A	31	23 74.2			8 25.8			49	40 81.6	4 8.2		5 10.2		
B	14	11 78.6	3 21.4					3				3 100		
C	13	7 53.8	4 30.8				2 15.4	0						
D	7				7 100			23	10 43.5	2 8.7		11 47.8		
E	14	8 57.1			4 28.6		2 14.3	0						
liquid ation	0							4						
total	79	49	7	0	19	0	4	79	50	6	0	19	0	0

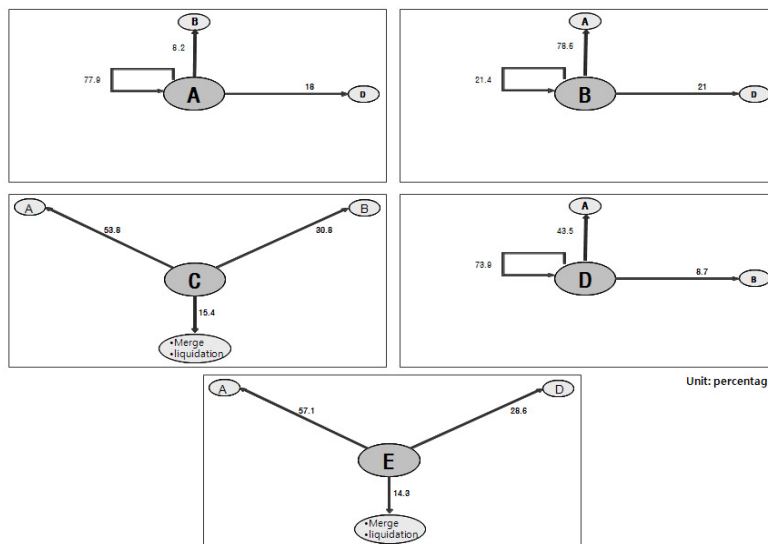
individual group presented in the state model, the PSTM model standardized A, B, C, D, and E to each path. The state model's A, B, C, D, and E clusters displayed specific transfer paths as of the following <Figure 5>.

First of all, group A (healthiest group) displayed a path where about 77.9% stayed at A group without moving. This means that the management tendency kept a wholesome state rather than growing or having stability. The banks which entered group A need a self-regulating business environment rather than the supervisory office's regulation. It displayed about 8.2% in case movement from group A to group B (stability group). This means that the extreme banks belonging to A group wanted a more stable state. On the other hand, the banks which moved from group A to group D (weak group) displayed 18%, which meant that the bank's management states worsened. A countermeasure that is described in

<Table 6> must be implemented for banks that moved to the weak group and decision-making must be made.

Secondly, group B (stability group) displayed a path where about 78.6% moved to group A (healthiest group) and 21.4% stayed in place. This meant that group B was the route in moving to a healthy state via stabilization step. On the other side, 21% of the banks moved from group B to group D (weak group). Therefore group D should be removed since the management state was worsened in group B. They will have to do some decision-making that will establish a support measure for banks that move to the weak group and should lead with stable managements.

Thirdly, group C (growth group) can move into group A (63.8 %) and group B (30.8 %) if the growth management succeeds because it displayed the group's characteristic which is based on growth. However they can be-



<Figure 5> Transition model

come mergers or end up liquidated (16.4 %) if they fail. Because group C displayed a transfer path from pole to pole, when the group is not weak or in danger, but they also fail to grow, the supervisory office must pick the relevant bank.

Fourth, most banks (about 73.9%) belonging to group D (weak group) can stay in place but there are paths towards group A or group B. However, they should know that banks moving to these groups will only gain health and stability, but not growth.

Finally, group E (danger group) can move (67.1%) to group A through specific regulations from the supervisory office or support, but when it is combined or left, there is only (14.3%). This means that the supervisory office's regulation acts effectively on the management state of the mutual savings bank. It also means that the support is connected to the IMF such as the commitment of large scale public funds and deriving transfers (28.8 %) in group D rather than in group A.

5. Conclusion

Through the Predictive State Transition Model (PSTM), the preemptive response and continuous risk management of banking supervisory office, deposit armature agency and self-regulation agency is possible and the availability of the self-examination of the small and medium financial agency's insolvency is anticipated. Details of the expectation effect is as following.

First, the preemptive response at super-

visory office is possible. There is indication that banking incident occurrence on an early stage can be found and can also be utilized when the supervisor policy is established.

Particularly, it can secure a public trust by using the banking supervisory agency's corrective action. It can lead normalization through a preemptive guidance (consulting of management, deriving increase of capital) to the financial agency's weak provision. Second, the anticipative risk management is available in the deposit armature agency. It can minimize public funds by deriving merger and contract move before a weak financial agency goes bankrupt and plans a management normalization. Also, it can derive an early normalization to insolvent symptom financial agency through anticipative response such as concentrating the improvement of management request. Third, an anticipative risk management is available in the self-regulation regulatory agency. It can derive an early normalization to support concentrically managerial resources to insolvent symptom financial agency and thus can prevent the fall of a whole public trust in small and medium financial agencies. Since the analysed data can confirm mutual savings in the bank's whole direction, practical use is also possible to the government's policy data. Finally, self-diagnosis to the small and medium financial agency's insolvent is available. It can prevent insolvent progress by finding it in the beginning and cure the insolvent indication weak parts and the requirements of improvement. Also the practical use of the function monitoring the medium and

small financial is monitoring a performance of management is possible.

Hereafter, there is a necessity to confirm the expectation effect of this study more genuinely through the study and establishment of the model. The development of the PSTM is based on actual data proof by given period of the change of management state of mutual savings bank of high relatively. Therefore, there is a necessity of verification of the current development of the study model based on the given period display, the exact management state of general mutual savings bank and the transfer of management state or change.

Also, the following problem happened in the progress study and it's estimated to reappraise the whole experiment process according to the process in this study. It must firmly supplement more than the model if the verification result (which is existent) appeared by the propriety.

First of all, there are many banks among the actual proof data used in the PSTM establishment by political intention with independently management state. They do this through the mother company's liquidation or through the manager's amorality. When liquidation is decided, only some things are estimated. Example of this is that the banks may have to erase the source date that is collected (existing) if it is grasped at the verification step.

Secondly, we applied four core study variables among the 17 study variables in this study through the expert survey, but if the model's effect is increased through executing experi-

ments of all 17 study variables, there is a necessity to amend models applying for all study variables.

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