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Identifying and Ordering the Influential Factors on Outstanding Claims by using Analytic Hierarchal Process (AHP)

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ABSTRACT

Outstanding claims or not repaying receptive facilities is one of the problems bank system encounters with and is looking for a way to prevent and tackle with. The current study aims to identify and order the influential factors on outstanding claims in banks by using Analytic Hierarchal Process (AHP) and to find ways to prevent and tackle with. 15 peripheral factors have been classified in 3 factors of outer-organization, inner-organization and applicants' abilities and capacities. They have been ordered by Analytic Hierarchal Process (AHP) and the software Expert Choice. The research findings show that the factor of outer-organization (country level) with the relative weight of 0.487, the factor of inner-organization (bank network) with the relative weight of (0.356, and the factor of applicants' abilities and capacities with relative weight of 0.157 are respectively the most and the least important factors in bank outstanding claims.

KEYWORD

Outstanding claims, facilities, Melli bank, Analytic Hierarchal Process (AHP)

INTRODUCTION

In bank systems which deal with fund flow, true and fast flow of resources and spending shows system health and effectiveness of its performance ways. It is of high importance specially in banks and finance and credit institutes, because these institutes can play the best role in performing monetary policies in any country.

Bank system importance, on the one hand, in producing internal economic relationships, from the other hand its effective role in world economy and simplifying and promoting international trade level caused economic authorities take banks into account as one of the main factors of economic growth and making countries production ability and capacity. Banks as one of the most important means of performing monetary policies are at the disposal of banks and economic system of every country, because it collects small savings and free funds of people and allocates needed finance to the certain sectors to perform determined economic and credit policies. Therefore, it encounters with some challenges which should be paid attention. One of the most important problems banks encounter with these days is the problem of outstanding claims (Davoudi Kasbi, 2004).To describe such a situation, banks treatment analysis and the factors making outstanding claims is of high importance. In fact, the problem of this study is identifying the main factors making outstanding claims in banking industry based on the existing theoretical and experimental basics including special factors of bank and macro-economic factors..

REVIEW OF THE LITERATURE

Based on the hypothesis that macro factors and banks features affect on these outstanding claims, Louzis, et al (2011) examined outstanding claims determiners in Greece bank system. This study shows that macro-economy factors and conditions such as GPD, unemployment, interest rate, public liabilities, and bank management quality are among the chief factors of these outstanding claims.

Podpira and Will (2008) tested the relationship between outstanding claims and cost effectiveness in Czech bank system from 1996 to 2005. This study showed that management weakness has a direct impact on outstanding claims. In addition, using neural network, Cifter, et al (2009) observed an interval effect of industrial production on the number of outstanding claims in Turkey finance system from 2001 to 2007.

Boyd and Gianni (2005) in a theoretical research, showed that the industrial focus of most banks has led to increasing interest rate which leads to the fact that loan receiving proprietorships go toward riskier operations which leads to increasing banks outstanding claims.

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Using a panel model for African countries, Fofack (2005) showed that GPA growth, Real Effective Exchange Rate, true interest rate, net income margin and Inter-bank Loans are among the main factors of outstanding claims in these countries.
Using data panel model in Taiwan from 1996 to 1999, Hu, et al (2004) studied the relationship between outstanding claims and trade banks possession structure. The obtained results showed that banks with governmental possession have lower rate of registered outstanding claims. There is also a negative relationship between bank size and outstanding claims and variety can not be a determiner factor. In addition, in a big panel of Italian banks, Quagliarello (2004) observed that trade cycle affects on outstanding claims from 1985 to 2000.
Allen and Gall (2000, 2004) showed that a bank structure with lower concentration and higher number of banks is more subject to finance crisis and outstanding claims. Under this theory, more concentrated bank system can cause banks higher amount of market-based power and productivity. Hgher productivity causes less motivation for banks for risky operation and causes lesser outstanding claims.
Using a large sample consisting of 119 countries containing 50000 finance and credit institutes with different possession structures, Micko et al (2004) showed that there is a direct relationship between governmental possession and outstanding claims. In addition, Jimenez and Saurina (2005) studied banking sector of Spain from 1984 to 2003. They presented some evidence standing for increasing outstanding claims because of higher GPA growth, high true interest rate, and easy credit conditions. This study also shows that Myopia, Herd Behavior and Agency Problems may deceive managers pay excessive loans at prosperity time.
Using a Regression panel analysis, Meanwhile, Rajan and Dhal (2003) showed that proper macro-economy situations are measured by GPA growth and factors such as maturity, credit and cost condition, bank size and credit tendency has significant effect on India trade banks outstanding claims.
Bercoff, *et al* (2002) examined Argentina bank system bankruptcy from 1993 to 1996 and showed that outstanding claims are affected by bank special factors and macr0-economic factors. To separate these factors, researchers use Survival Analysis procedure.

THE RESEARCH QUESTIONS

The current study aims to answer the following questions using AHP
Main question:
What are the main factors influencing on outstanding claims of Golestan province Melli bank?
Peripheral question 1:
1. What are outer-organization (country level) factors influencing on outstanding claims of Golestan province Melli bank?

Peripheral question 2:
2. What are inner-organization (bank network) factors influencing on outstanding claims of Golestan province Melli bank?

Peripheral question 3:
3. What are abilities and capacities of facilities applicants factors influencing on outstanding claims of Golestan province Melli bank?

DATA ANALYSIS AND INSTRUMENTS

As data analysis of the current research is based on multiple aspect models and these methods are based on mathematical calculations, in this study, factors influencing factors on bank outstanding claims are obtained in all branches based on group decision making such as Delphi and Brainstorming with people who are fully aware of bank outstanding claims. Then these key factors areby AHP questionnaire. These factors are measured under decision making matrixes in paired form and by mixing different people ideas by using geometric mean. Then by multiplying the obtained matrix by choices weights, each choice priority is determined by the higher weight. It is remarkable to say that data analysis is done by Team Expert Choice and Excel software.

The population of this study contains all managers, branch bosses and experts of Golestan province Melli bank who were fully aware of this field. In this research 22 people have been selected as experts among whom the questionnaire of paired comparison (AHP) has been distributed.

The place area of this study includes all branches of Melli bank which are active in Golestan province. Required data have been collected in spring of 2013.

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Main factors	Abbreviation	Main factors	Abbreviation
Outer-organization	A	The difference between bank facilities rate and market interest rate	A1
		The difference between inflation rate and banks interest rate	A2
		Government economy structure	A3
		Instability of monetary policies and frequent change of regulations	A4
		Currency rate change and dominant global economic crises	A5
Inner-organization	B	Lack of a proper system for measuring credit of customers	B1
		Facilities process quality weakness	B2
		Lack of enough observation in the way of spending facilities	B3
		Lack of proper management in assets items	B4
		Longer getting of examining and paying facilities	B5
Facilities applicants' abilities and capacities	C	Economic sectors managers' lack of mastery over management and its relevant parts	C1
		Some activities' lack of justifiability (in terms of type and capacity)	C2
		Lack of mastery over market and rivals	C3
		Lack of implementing expert people and lack of staff evaluation system and staff job security and motivation instruments	C4
		Some plans strong dependence on bank credits and low ability of loan receivers financial ability	*C5*

Data analysis

The process of this research based on AHP was constructed on strict steps.

First step: developing hierarchy tree of AHP

First regarding reviewing the related literature and using experts of Golestan province Melli banks, decision making tree hierarchy should be designed to identify factors influencing on banks outstanding claims. As a product of this process, 15 influential factors have been classified under 3 main factors which are as follows:

Table1: introducing main and peripheral factors with abbreviations

Second step: main factors weight (level1)

In the second step, to calculate each of these main factors, a questionnaire like AHP questionnaire (paired comparison) has been provided to get experts ideas. This questionnaire consists of a matrix for paired comparison of factors. Therefore, there are as many comparisons as the number of items. As level 1 has three factors the number o

comparisons and items is obtained by $\frac{n(n-1)}{2}=\frac{3(3-1)}{2}=3$

after completing the questionnaires, the rate of incompatibility of each of these experts has been obtained separately. Finally 22 questionnaires have been considered and by the software Expert Team Choice, people ideas (geometric mean) have been mixed with each other. This software had different capabilities to use paired comparison matrixes and to mix different people matrixes and to turn them into a unified matrix which is obtained through geometric mean of every matrix of every person.

It is remarkable to say that to take experts' ideas, paired comparison of main and peripheral factors with each other based on clock scale of 1-9 has been implemented.

Table 2: mixed matrix (geometric) paired and group comparisons of level 1 (main factors)

Main factors	A	B	C	Weight	Rank
A	1	1.876	2.345	0.487	1
B	0.533	1	3.123	0.356	2
C	0.426	0.320	1	0.157	*3*

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The result of table 2 shows the weight of main factors in which the factor of outer-organization (country level) with the relative weight of 0.487 ranks first, the factor of inner-organization (bank network) with the relative weight of 0.356 rank ,second and the factor of facilities applicants' abilities and capacities with the relative weight of 0.157 ranks third.

Table 3: normalized matrix of paired comparisons

	A	B	C	Line sum	Weight
A	0.510	0.587	0.363	1.460	0.487
B	0.272	0.313	0.483	1.068	0.356
C	0.217	0.100	0.155	0.472	*0.157*

For example geometric mean of array a_{12} is obtained as follows:

$$a_{12} = (2 \times .... \times 7)^{\frac{1}{22}} = 1.876$$

Regarding to the principle of reversibility in Analytic Hierarchy Process (AHP), the items below the diagonal of reverse matrix are the items of over the diagonal. For example a_{21} is obtained as follows:

$$a_{21} = \frac{1}{1.876} = 0.533$$

Other items of the table are obtained by the same way. The obtained results are inserted in table 4.

The way of calculating level 1 weights is mentioned below. After obtaining the geometric mean of Melli bank experts ideas, problem decision making matrix is normalized by the following method:

$$r_{ij} = \frac{\overline{a_{ij}}}{\sum_{i=1}^{n} \overline{a_{ij}}}$$

For example, to obtain $r_{11}r_{21}$, matrix gets normalized and follow the following procedures. First all arrays of the first column of mixed matrix (geometric) are added together:

$$\sum_{i=1}^{5} \overline{a_{i1}} = 1 + 0.533 + 0.426 = 1.959$$

lower than 0.1 $(IR \le 0.1)$, therefore, in paired comparisons there is compatibility.

Then we divide $\bar{a}_{11}$ from mixed matrix (geometric) on the total of the first column $\sum_{i=1}^{n} \overline{a_{ij}}$

$$\overline{a_{11}} = \frac{1}{1.959} = 0.511$$

The rest of normalized matrix are calculated like above results of which are resented in table 3.

After normalizing group decision making matrix, it turns to calculate weighing level 1 components.

whose weights are obtained by line mean relationship of which is obtained as follows:

For example, to calculate weight of A, first all items of first line of normalized matrix are added with each other and then are divided on all main factors which are 3 factors. Therefore, we have:

Therefore, other weights are calculated as above and the results are presented in table 3.

The way of calculating compatibility of group decision

$$WSV = \begin{bmatrix} 1 & 1.876 & 2.345 \\ 0.533 & 1 & 3.123 \\ 0.426 & 0.320 & 1 \end{bmatrix} \times \begin{bmatrix} 0.487 \\ 0.356 \\ 0.157 \end{bmatrix} = \begin{bmatrix} 1.518 \\ 1.098 \\ 0.477 \end{bmatrix}$$

making matrix:

To be able to trust the ranking of influential factors on bank outstanding claims of Melli banks of Golestan province, incompatibility Rate (I.R) of paired comparison. The stages of calculating incompatibility rate is as follows:

First step: calculating total weight vector (WSV): $WSV = D \times W$

First we multiply paired comparison matrix D (table 2-4) by relative weight vectors (W):

Second step: calculating compatibility vector (CV)

Total weight vector items are divided on relative weight vectors, the obtained vector is called compatibility vector.

Table 4: mixed matrix (geometric) of paired and grouped comparisons of peripheral factors – outer-organization Abecause this amount is

Peripheral factors- outer-organization A	A1	A2	A3	A4	A5	Weights	Rank
A1	1	0.532	0.335	0.248	0.414	0.077	5
A2	1.879	1	2.941	0.698	0.564	0.196	3
A3	2.984	0.340	1	0.266	0.252	0.105	4
A4	4.021	1.431	3.752	1	2.431	0.368	1
A5	2.41	1.772	3.953	0.411	1	0.253	2

IR=0.08<0.1 incompatibility rate

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THIRD STEP: CALCULATING SECOND LEVEL ITEMS (LOCAL WEIGHTS)

$$W_i = \frac{\sum_{i=1}^{n} w_{ij}}{n} \quad , j = 1,2,...,n \qquad , \sum_{i=1}^{n} W_i = 1$$

The third step is calculating the peripheral weights of factors influencing on outstanding claims in Golestan province Melli banks in each subgroup. The results are as follows:

Table 5: mixed matrix (geometric) of paired and grouped comparisons of peripheral factors – inner-organization B

facilities applicants' abilities and capacities C	C1	C2	C3	C4	C5	weight	Rank
C1	1	0.391	1.501	0.468	3.541	0.161	3
C2	2.555	1	2.431	0.311	4.765	0.263	2
C3	0.666	0.411	1	0.403	3.213	0.131	4
C4	2.134	3.21	2.478	1	2.431	0.378	1
C5	0.282	0.209	0.311	0.411	1	0.067	5

IR=0.01<0.1 incompatibility rate(

Table 6: mixed matrix (geometric) of paired and grouped comparisons of peripheral factors – facilities applicants' abilities and capacities C

inner-organization B	B1	B2	B3	B4	B5	weights	Rank
B1	1	0.187	0.308	0.233	0.311	0.055	5
B2	5.324	1	2.45	0.796	0.306	0.201	3
B3	3.24	0.408	1	0.403	0.237	0.104	4
B4	4.28	1.256	2.478	1	2.342	0.328	1
B5	3.214	3.264	4.214	0.426	1	0.313	2

IR=0.01<0.1 incompatibility rate(

The results of table 4 show that instability of monetary policies and frequent changes with the relative weight of 0.368 rank first, the factor of currency rate change and economical crises in the world with the relative weight of 0.253 ranks second, and the difference of inflation rate and banks interest rate with the relative weight of 0.196 ranks third, governmental economy structure and imperative outlook to credit sector with the relative weight of 0.105 ranks fourth, the difference of bank facilities rate with market interest rate with the relative weight of 0.077 ranks fifth. relative weight of 0.101 ranks fourth, and the finally the factor of lack of a proper customers' evaluation system with the relative weight of 0.055 ranks fifth.

process quality weakness with relative weight of 0.201 ranks third, the factor of insufficient observation on the way of spending facilities with the relative weight of 0.101 ranks fourth, and the finally the factor of lack of a proper customers' evaluation system with the relative weight of 0.055 ranks fifth. The results presented in table 5 show that effective management on assets items with relative weight of 0.328 ranks first, the factor of long process of examining and paying bank facilities with the relative weight of 0.313 ranks second, the factor of process quality weakness with relative weight of 0.201 ranks third, the factor of insufficient observation on the way of spending facilities with the

The results of table 6 show that not implementing expert work force and lack of staff and their motivation and security evaluation system and motivation and security with the relative weight of 0.378 ranks first, the factor of lack of justifiability of some activities (in terms of the type of activity) with the relative weight of 0.263 ranks second, the factor of managers' ignorance of some management knowledge and some other relevant knowledge with the relative weight of 0.161 ranks third, and not having mastery over market and rivals with the relative weight of 0.131 ranks fourth, severe dependence of some plans on banks credits and low financial power of facilities receivers with the relative weight of 0.067 ranks fifth.

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FOURTH STEP: FINAL WEIGHT OF ITEMS

The final weight of items of each group is equal to multiplying local weight of items by their heads weights (main factors) and finally the rank of each factor influential on outstanding claims of Golestan province Melli bank is determined. The results of this step have been presented in table 7. The results of table 7 show the weight of 15 peripheral factors of bank outstanding claims in which instability of monetary policies and frequent change of regulations with the relative weight of 0.179 ranks first, currency rate change and dominant global economic crises with relative weight of 0.123 ranks second, lack of proper management in assets items with relative weight of 0.116 ranks third, longer getting of examining and paying facilities with relative weight of 0.111 ranks fourth, the difference between inflation rate and banks interest rate with relative weight of 0.095 ranks fifth, facilities process quality weakness with relative weight of 0.071 ranks sixth, lack of implementing expert people and lack of staff evaluation system and staff job security and motivation instruments with relative weight of 0.059 ranks seventh, government economy structure with relative weight of 0.051 ranks eighth, some activities' lack of justifiability (in terms of type and capacity) with relative weight of 0.041 ranks ninth, the difference between bank facilities rate and market interest rate with relative weight of 0.038 ranks tenth, lack of enough observation in the way of spending facilities with relative weight of 0.037 ranks eleventh, economic sectors managers' lack of mastery over management and its relevant parts with relative weight of 0.025 ranks twelfth, lack of mastery over market and rivals with relative weight of 0.020 ranks thirteenth, lack of a proper system for measuring credit of customers with relative weight of 0.019 ranks fourteenth, and finally some plans strong dependence on bank credits and low ability of loan receivers financial ability ranks fifteenth.

THE RESEARCH FINDINGS

The results of table 2 show the weight of main factors of Golestan province Melli bank outstanding claims in which the factor of outer-organization (country-level) with weight of 0.487 ranks first, the factor of inner-organization (bank network) with weight of 0.356 ranks third, and the factor of bank facilities applicants' abilities and capabilities with weight of 0.157 ranks third.

Table 7: ranking influential factors of outstanding claims of Golestan province Melli bank based on Analytic Hierarchy Process (AHP)

Main challenges	Main challenges weights	Peripheral weights	Peripheral challenges weight	Final weight	Rank
Outer-organization	0.487	A1	0.077	0.038	10
		A2	0.196	0.095	5
		A3	0.105	0.051	8
		A4	0.368	0.179	1
		A5	0.253	0.123	2
Inner-organization	0.356	B1	0.055	0.019	14
		B2	0.201	0.071	6
		B3	0.104	0.037	11
		B4	0.328	0.116	3
		B5	0.313	0.111	4
The bank facilities applicants' abilities and capacities	0.157	C1	0.161	0.025	12
		C2	0.263	0.041	9
		C3	0.131	0.020	13
		C4	0.378	0.059	7
		C5	0.067	0.010	*15*

DISCUSSION AND CONCLUSION

Although it is impossible to limit all problems of banks dealing with increasing outstanding claims to the factors mentioned in the current research, removing these factors can decrease rising trend of outstanding claims. It seems that improvement from inside and interaction from outside is the best motto for banks to change the existing situation. Improving the internal trend of banks before, during and after giving facilities and on the other hand, full interaction with all organizations and institutions for getting bank facilities can stop banks rising trend of outstanding claims and make the trend falling.

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