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Prioritizing of Credit Ranking Criteria of Isfahan State Banks' Costumers by Using AHP Fuzzy Method

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Abstract

The purpose of this study is to recognize the effective factors and Prioritizing of the validation criteria used to evaluate the natural and legal costumers' credit risk. Hence, we have chosen the central bank's branches in Isfahan (Refah, Keshavarzi, Sanat o Madan, Maskan, Sepah) as the statistical sample. Therefore the required information gathered by questionnaires from selected bank's credit officials and analyzed by Expert Choice software. After studying the theoretical bases and former researches, first of all, we have recognized the main variables of the credit evaluation used by banks and among them we have chosen four variables (personality, conditions, financial situation, and assurance) along with sub-variables. Then using the respondents' opinions and AHP Fuzzy method, the validation criteria of Isfahan banks' costumers is ranked. Implying the authentication of the economic and financial theories in effective factors on credit risk's domain, we could predict that the effective factors on banks costumers' risk do not have the same weight and some of the variables in costumers' credit risk evaluation have more importance than the others.

Keywords: Credit Risk, Validation, Banks' Costumers and Ranking, The Analytical Hierarchy Approach, The Validation Criteria

Introduction

Nowadays according to the credit industry development and dynamic procedure, the industry has an important role in every country's economy. However, increase in credit demand, increasing competitions and the emergence of new channels in the new economy, has created new opportunities for Credit Institutions, but it made them requiring new tools and methods as well. This issue led these institutions to reconsidering, empowerment and bringing in new technologies in credit management procedure.

Credit ranking models, are one of the most important and most basic decision makings systems that have a major part in providing the required information by the credit institutions

in credit management. The credit ranking models objective is predicting the probability of customers 'lack of repayment to classifying credit applicants into two groups: good and bad applicants. In other words, credit ranking is a series of decision making models and related methods that help the creditors to grant credit to customers. A lender must make two types of decisions: First, does it give credit to a new applicant or not, and second, how to behave with current customers. Methods that decide for the first question are called credit rating, while methods that decide for the current customers are called behavioral ratings.

Financial managers in financing have to pay enough attention to the financial flexibility, in other words, financial managers must be concerned that lest the decisions today endanger future financing or future growth and advancement opportunities of the company; this is the same financial flexibility concept. Not paying enough attention to this concept in financing decisions, will create a risky situation for the company; because if the company isn't able to provide the required resources from financial market when needed, it would be obliged to ignore appropriate financial opportunities due to lack of required resources. Providing these resources accomplishes through the financial market which the credit market is a part of it, and is the duty of the banks and credit institutions. Due to limited resources and high demands, credit risk assessment is of high importance.

A few researches has been done in the field of prioritizing the credit ranking criteria, while if the customers be aware of these factors stay less in waiting lines to get credits. On the other hand recognizing the criterions with mentioned preferences make it possible to consider these factors for banks authorities while delivering the credits.

Literature Review

Since the establishment of first credit rating agencies in 1900, which started with publishing of industrial securities guidelines, credit rating industry has grown rapidly, and has gained a special place in the financial markets. Today, more than 130 credit rating institutions around the world are responsible for rating credit companies, asset-backed securities, trading securities, private placement, certificates of deposit, preferred stock, and etc. The group of institutions is internationally active which among the most famous one Moody's, S & P, Fitch is and IBCA can be noted. In Iran, rating is done be Central Bank and Iranian consulting companies. Many researches and applications in validation field have been done to recognize the good and bad bank costumer's. Among these studies including Fisher(1936)about demand for credit evaluation system, Durand(1941)using discriminant analysis and relying on Fisher's results, Beaver article (1967) about success and failure of corporations base on financial factors, Altman analysis (1968) about designing Z score model (discriminant analysis) in order to credit risk measurement model, Tracy research (1998) about designing in danger value model to determine density function of repayment probability, Yu-Ru Syau et al research (2001) about credit rating of enterprises' financial conditions, Mars Ryser and Stefan Denzler study (2009) about selecting credit rating model based on comparison of discriminatory power, and Peter Hájek study (2011) based on credit rating analysis using adaptive fuzzy systems in industries, Chatterjee et al. (2010) wrote a paper entitled "Study of AHP method application in India banks ranking". In their paper, they prioritized 12banks of India, Michnik and Mei-Chen Loin 2003 using AHP approach determined the relative importance of various aspects of financial risk management and FRM performance improvement.

Rating

Validation means evaluation and measurement of ability to repayment of financial facilities by applicants and their received credits lack of repayment probability. Validation is a formal opinion about natural and legal customers of banks and finance and credit institutes which is stated by credit validation institutes and makes it possible to have a better knowledge about people's financial conditions and power in order to repay the received facilities and receiving more services. Rating assessment (rating of credit), in fact, provides the necessary insight to understand customers' credit risk for a firm.

Validation phase in customer's credit evaluation is recognizing the main factors influencing on credit risk. The basis of Validation has been established on data analysis. In the validation process, customers are evaluated and ranked base on different characteristics and factors.

This rank or score represents in fact, customers financial credit that bank can decide faster and more accurate based on it for service provision to customers. Higher profits in the financial activities is associated with a higher risk; in such circumstances credit portfolio is arranged with a perspective to the both profit and risk components which in addition to acceptance of a reasonable risk help the procedure of granting facilities be accompanied with profitability. Designing such a portfolio requires creating a balance between potency of risk appetite and expected profit. In such circumstances the credit rating system for customers to create a balance between risk and benefit is necessary and there is no doubt that the absence of such a system will hurt the existence and formation of an efficient and optimal credit portfolio which provide financial benefits for these institutions.

Validation refers to the practice that measure the credit of the legal and natural banks and financial and credit institution customers according to the received information from them and effectuate the possibility to more recognize their financial and power condition for repaying assigned facilities and receiving more services. Based on this method, credit risks of peoples are measured and individual and customers are classified and rated based on their credit risk. Credit institutions and banks require a system to credit rate their costumers for two reasons. Customer credit rating system make it possible for banks and credit institutions that with relying on such a system based on the assignment rates, reduce their credit portfolio risk as much as possible and choose between facilities applicants, the more reliable and less risky ones. In credit institutions that the possibility to determine the facilities rate is based on costumer's credit degree and risk, Credit rating system can help these organizations in designing their credit portfolio with respect to the diversity principle. Providing accurate and optimal financing facilities is considered one of the most important activities of the banking system. Accordingly, in many countries, most banks have a special and separate unit of credit analysis with the goal of maximizing the value added for the share holders through the management of credit risk. Banks prepare a list of various factors about facilities applicant like his previous credit records (which is usually determined by credit institutions) applicant wealth, fluctuations in applicant interest rate and does the default should be included in the contract? And they estimate the risk or possibility of applicant default. As stated purpose of rating is the quality of a borrower and his repay to market prospects. Ranking shave the potential to establish reputation for a firm in the market in external observers, such as supervisory authorities and market participants' point of view. The authentication of rating information is closely associated with the acceptable ratings rules. Rating floors are short forms of credit risk. Ranks could be related to the relative frequency of defaults or could be considered as a basis for valuing an asset according to past information.

The most significant demand for rating in a company's debt and asset management section is when the adjusted capital returns base on risk is considered as base criteria for partial performance evaluation. Ranks make it possible for banks to measure credit risk and manage it according to their credit portfolio and also adjust and modify the bank exposure concept in relation to any kind of risk.

There are different methods which a rank can be obtained through them. Among them, the possibility of default measurement method can be mentioned. A specific method which is used nowadays is scoring method. This method is based on a set of criteria which every one of them are well defined. Every criterion is scored differently. A weight is given to every score which is related to a set of criteria, then these weights are summed. The result is a total score. This score is converted to a rank level which is placed between the range of minimum total score and maximum total score. A clear example about this case is the Z-score which is proposed by Altman in 1968.

Altman proposed that the relation between historical experience of default and some of the accounting variable (mainly balance and income statement) be studied in order to determine a single optimal function between the publishers who will commit default in future and also those who continue their activity. The estimated function weights are usable for predicting default possibility of a firm. These weights which are named Z-score can be converted to a level of rank. Following this method Altman proposed customers ranking methods in 1980.

The accomplished surveys on Germany's banks state that all institutions apply scoring method. In order to recognize and evaluate the credit risk of customers and using required information to recognize and evaluate credit applicants and make proper decisions and also reducing the risk, banks use the facilities provided by the comprehensive credit assessment system. In other words, credit report system is formed with the purpose of facilitate the process of granting credit and serving the credit system. It provides useful services for the economic and financial part by forming a comprehensive database which includes identity information, credit history, repayment mode and criminal records of legal and natural persons. Comprehensive system of credit assessment is also able to provide useful services for other parts of industry like telecommunication, insurance, and leasing. Comprehensive system of credit assessment is an independent organization that provides complete and comprehensive information of consumers (natural and legal customers) such as, general information, legal information, identity information, credit contracts and bank facilities records. These kinds of organizations provide valuable services for economic/financial part of country through keeping personal facilities and individual business activities reports.

Credit Ranking and Scoring Criteria

Regarding the complexity of economic environment and activities, banks have to choose proper models for the purpose of. Customers credit rating evaluation. To achieve that criterions that are used in previous researches are gathered and shown in table 1.

In this paper the criterions mentioned above are classified into four groups, character, security, conditions and financial status, and are shown in figure 1 (credit rating criteria in this research).

Table 1. Credit rating criterions in previous researches

Research title	Researchers	Credit rating criteria
Designing intelligent combining system for credit rating of bank customers using hybrid fuzzy logic models	Ali Rajab Zadeh, Arash Bahram Mirzayie, Parviz Ahmadi (2009)	Having the knowledge in interested field of activity- age- education- not having unpaid obligations-not having bounced check-not having criminal records-activity background with bank-income situation- current account circulation situation in the branch-physical facilities-potential assets for hypothecation- other guarantees (to rate natural customers) Having the knowledge in interested field of activity, management background of managers, managers education-type of corporation- not having unpaid obligations-not having bounced check-no criminal records for managers, activity back ground with bank- product features-imported raw material to produced raw material ratio-product export-raw material share from production-customers range- sale system-workforce situation- pricing the production-physical facilities-technology- potential assets for hypothecation- other guarantees- type of demanded facility- financial records credit (to rate legal customers)
Neural network application on credit rating of differed payment sale of loan applicants	Hamid Nilsaz, Abd Alrahman Rasekh, Alireza Assareh, Hassanali Sinayee (2006-2007)	Credit situation, applicant job, gender and marital status, duration of employment, loan objective, housing status, saving account balance, credit record, assets, current account balance
Application of Neuro-fuzzy logic system in credit rating legal bank customers	Mahdieh Akhbari, Farimah Mokhatab Rafee (2009-2010)	Current ratio, quick ratio, debt ratio, investment ratio, activity ratio, collection ratio, collection period ratio, return on net worth ratio, return on asset ratio, asset turnover ratio, profit margin, inventory turnover ratio, net worth to total assets ratio
Credit rating the legal customers of Iran Parsian Bank	Mohsen Mehrara, Meysam Mosayi, Mahsa Tasavori, Ayat Hasan Zadeh	Type of security, type ownership, customers cooperation with bank background, customer capital, current ratio, quick ratio, current assets to total assets, total asset turnover, current capital turnover, debt ratio, proprietary ratio

Analytic Hierarchy Process

In science of decision making which is about choosing an option from available options and prioritizing of solutions the Multiple Attribute Decision Making Methods (MADM) has been used for several years. Among these methods Analytical Hierarchy Process (AHP) have

been used more than other methods in management science. AHP is one of the most well-known techniques in MADM. It was first invented by Thomas L. Saaty, originally from Iraq, in the 1970s. AHP reflects the natural behavior and human thought. This technique analyzes complex problems based on their interactions and converts them into a simple way to solve them.

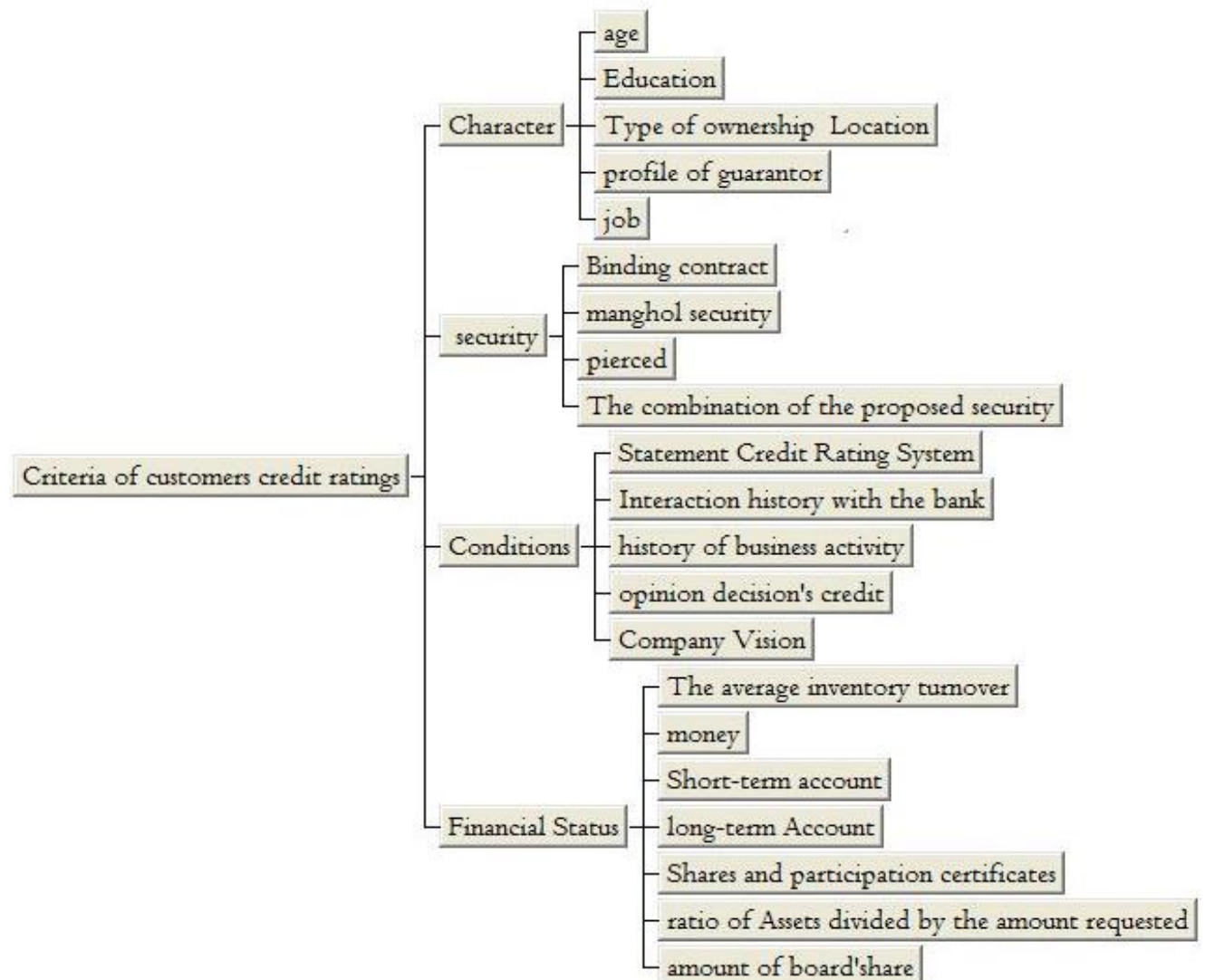


Figure 1. Hierarchical Decision Tree

Hierarchical analysis process could be use when the decision making faces with some rival options and decision criteria. Mentioned criteria can be quantitative and qualitative. This decision making method is based on paired comparison. Decision-maker begins by providing a hierarchical decision tree. Hierarchical decision tree shows under comparison factors and rival options which are evaluated in decision. Then accomplishes a series of paired comparisons. These comparisons shows weight of each factor Along with evaluated rival options in decision. Finally, the logic of Analytical Hierarchy Process integrates the matrices of paired comparisons to make the optimal decision. Comparisons accomplished by experts are done using Table 2 [6].

Table 2. Rating range

Numerical value	Type of preferences
1	Equally preferred
3	Moderately preferred
5	Strongly preferred
7	Very strongly preferred
9	Extremely preferred
2,4,6,8	Intermediate preferences

A few studies have been done on the application of AHP in the banking sector. About 18 papers on the application of AHP in the area of finance have been identified that among them only 8 papers have pointed out to the application of this approach in banking. Most of these cases have been observed since 1990. These applications include: forecasting foreign exchange rate by Ulengin and Ulengin [29], Business Strategy Formulation for a Financial Institution in a Developing Country by Vargas and Roura-Agusti [30], selecting industry rating for investment promotion by Rashid and Tabucanon [25], selecting a financial instrument for a foreign investment by Meziani and Rezvani [23], international investment risk analysis by Jensen [22], evaluation of employees in financial institutions by Jablonsky [21], the prediction of corporate bankruptcy by Hogan et al. [20] and bank strategic planning for mergers and acquisitions processed by Arbel and Orger, [14].

Methodology of Research

The present method of research is an exploratory and descriptive one, due to its special purpose and nature. The research is descriptive (or survey), because for collecting experts' opinions questionnaire is used. Because researchers seek to prioritize the criteria for ranking bank customer, so the study is exploratory.

The statistical population and sample

Statistical population of this research is all authorities of credit facilities of central branches of selected banks in Isfahan. Due to scattering and extent of geographic scope of the research, sample selection has been based on available sampling. 5 banks in Isfahan state have been selected as samples. The required information has been obtained from them.

Collection and data analysis methods

The method used in this paper to collect data was questionnaires, because data study method was the field study. First, the four main variables have been pair compared in this questionnaire, and then each sub-variable considering the main variables are compared with each other. Since these variables have been chosen based on the directive of the Iran Central Bank they have high validity. For the purpose of data analysis the Expert Choice software was used and its outputs are presented in this paper.

Findings and Results

As you can see in table 3, banks credit authorities have different views regards to four major criteria considered in this article. This difference in perspective can be observed also in table 4 that compares the sub- criteria for each bank, which proves these criteria are not

equally importance. So that with combining the results of each bank, order of importance of four major criteria is in this way; financial situation, collateral, character and circumstances.

Considering the fact that each one of sub-criteria has different degree of importance, with the help of software and combining the opinions of different bank authorities a general compare have been accomplished. Figure 2 shows degrees of importance of all sub- criteria in combine model.

Table 3. Range importance of major criteria

The Combine banks	Sepah	Industry & Mine	Agriculture	Refah	Maskan	Range
Financial Situation	Character	Financial Situation	Collateral	Financial Situation	Character	1
Collateral	Collateral	Character	Financial Situation	Circumstances	Collateral	2
Character	Circumstances	Circumstances	Circumstances	Collateral	Circumstances	3
Circumstances	Financial Situation	Collateral	Character	Character	Financial Situation	4

Table 4. Comparing sub-criteria importance order from banks credit authorities' point of view

Rank	Maskan	Refah	Agriculture	Mines & Industry	Sepah
1	Guarantors specifications	Long term accounts status	Combination of proposed collaterals	Shares and participation bonds of the corporation	occupation
2	Occupation	Effective interaction with bank background	Enforceable contract	Boards of directors shares	Guarantors specifications
3	Type of ownership residence	Account turnover average	Asset to requested ratio	Short term account status	Enforceable contract
4	Movable collateral	Short term account status	Account turnover average	Occupation	age
5	Effective interaction with bank background	Cash (liquid)	Short term account status	Long term accounts status	Combination of proposed collaterals
6	Combination of proposed collaterals	Enforceable contract	Movable collateral	Credit validation system declarations	Type of ownership residence

7	Credit decision maker comment	Shares and participation bonds of the corporation	Effective interaction with bank background	Guarantors specifications	Credit decision maker comment
8	Asset to amount requested ratio	Asset to amount requested ratio	Promissory note or endorsement of authentic individuals	Account turnover average	Movable collateral
9	Education	Business activity background	Credit decision maker comment	Credit decision maker comment	Education
10	Business activity background	Boards of directors shares	Long term accounts status	Asset to amount requested ratio	Education
11	Cash (liquid)	Guarantors specifications	Guarantors specifications	Education	Business activity background
12	Business activity background age	Industry or firm perspective	Cash (liquid)	Combination of proposed collaterals	Long term account status
13	age	Promissory note or endorsement of authentic individuals	Shares and participation bonds of the corporation	Type of ownership of residence	Industry or firm perspective
14	Enforceable contract	Credit decision maker comment	Business activity background	Cash (liquid)	Asset to amount requested ratio
15	Credit validation system declarations	Occupation	Occupation	Effective interaction with bank background	Promissory note or endorsement of authentic individuals
16	Account turnover average	Combination of proposed collaterals	Boards of directors shares	Movable collateral	Account turnover average
17	Promissory note or endorsement of authentic individuals	Credit validation system declarations	Type of ownership of residence	Industry or firm perspective	Cash (liquid)

18	Industry or firm perspective	Type of ownership residence	of Industry or firm perspective	age	Credit validation system declarations
19	Long term account status	Movable collateral	age	Business activity background	Shares and participation bonds of the corporation
20	Short term account status	Education	Credit validation system declarations	Promissory note or endorsement of authentic individuals	Boards of directors shares
21	Boards of directors shares	of age	Education	Enforceable contract	Short term account status

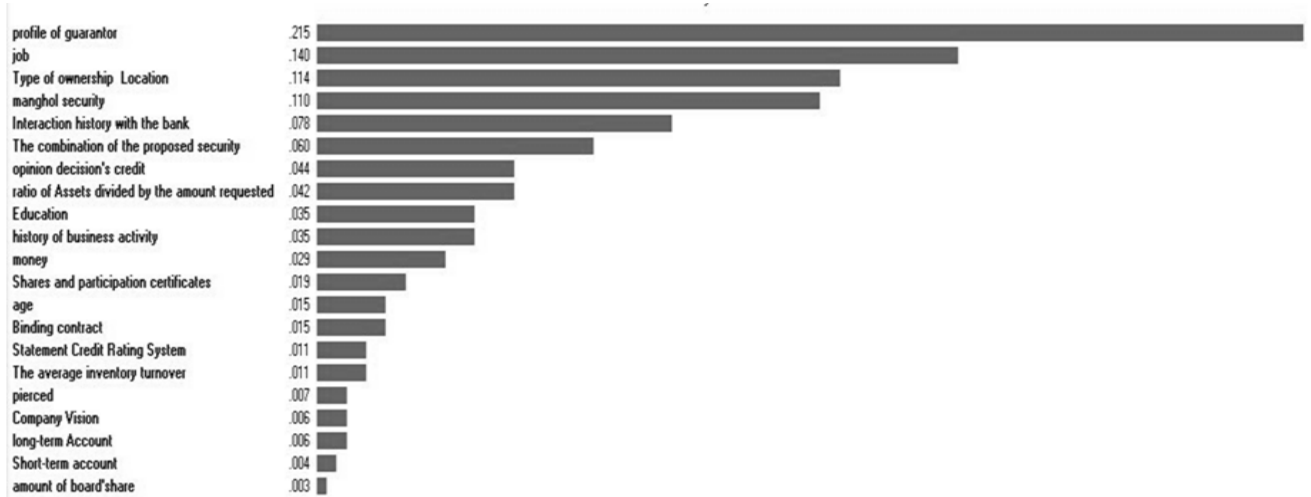


Figure 2. Range importance of sub- criteria for Maskan Bank

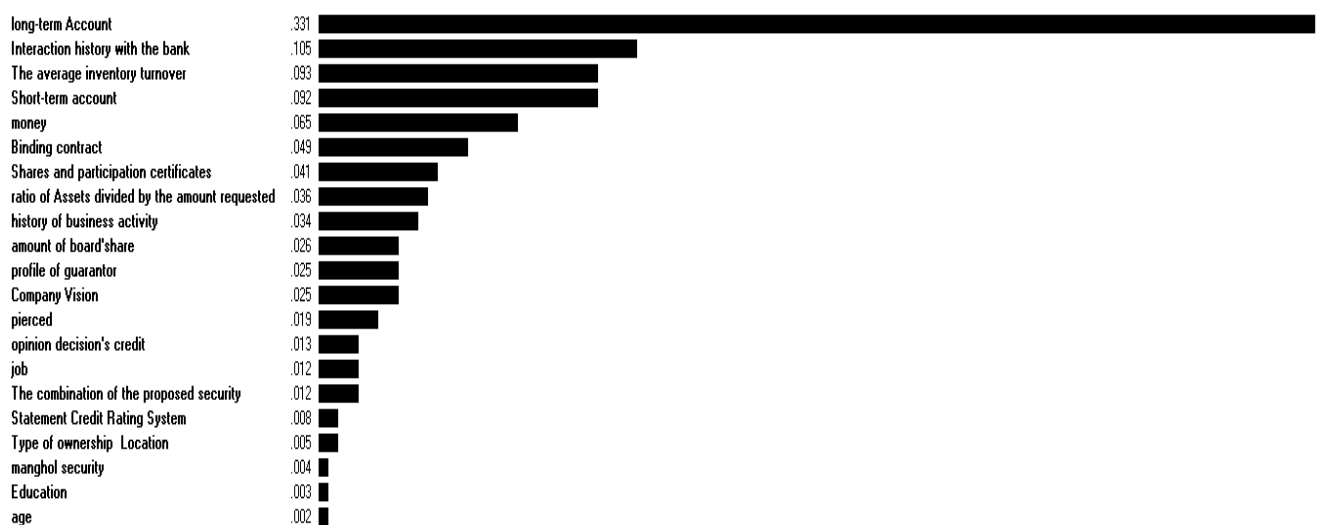


Figure 3. Range importance of sub- criteria for Refah bank

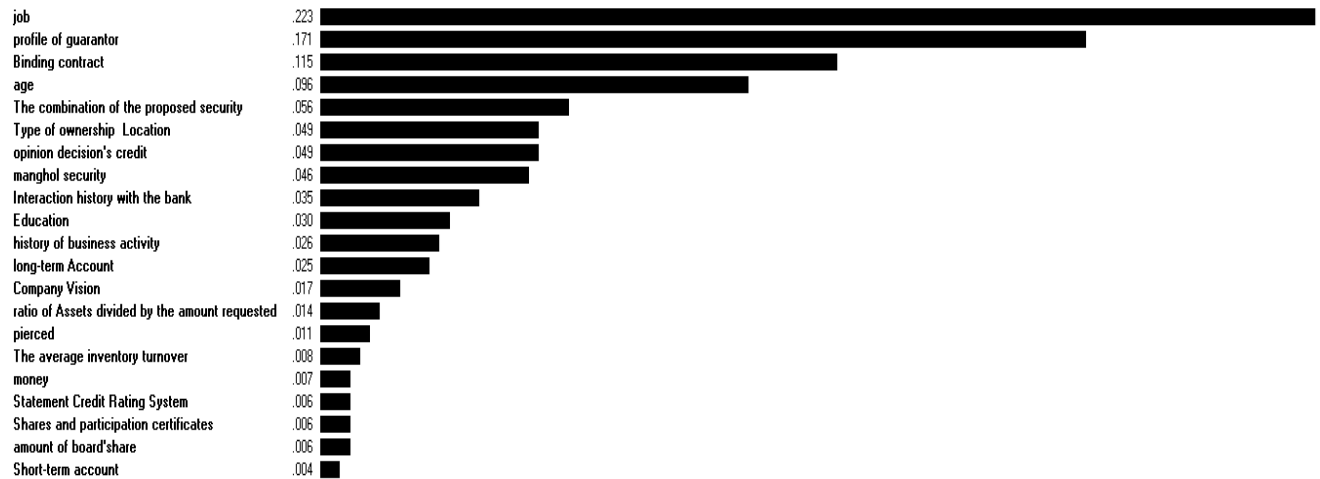


Figure 4. Range importance of sub- criteria for Sepah bank

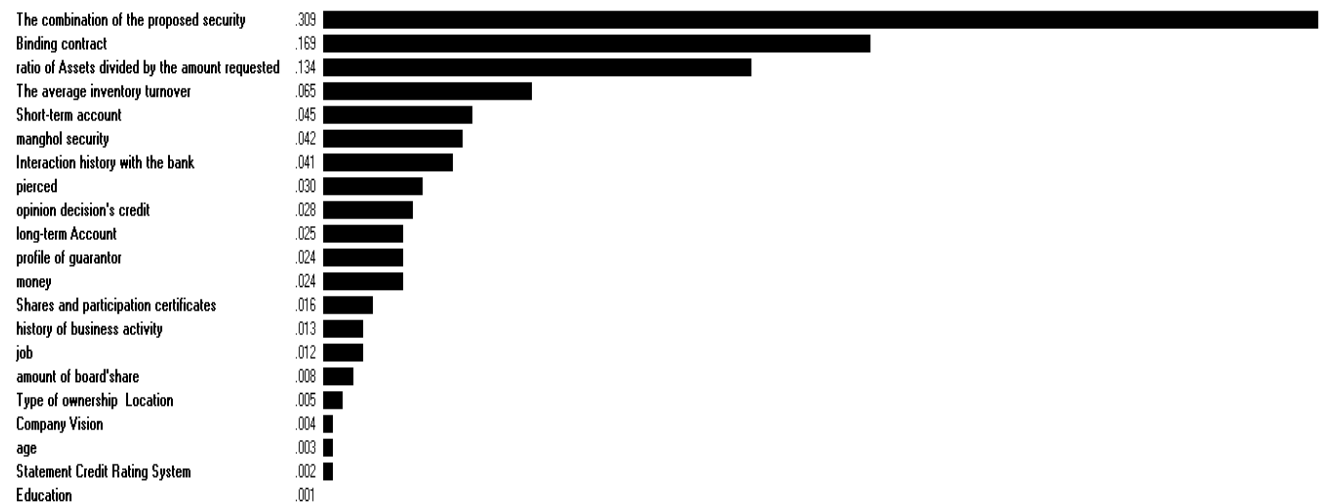


Figure 5. Range importance of sub- criteria for Agriculture Bank

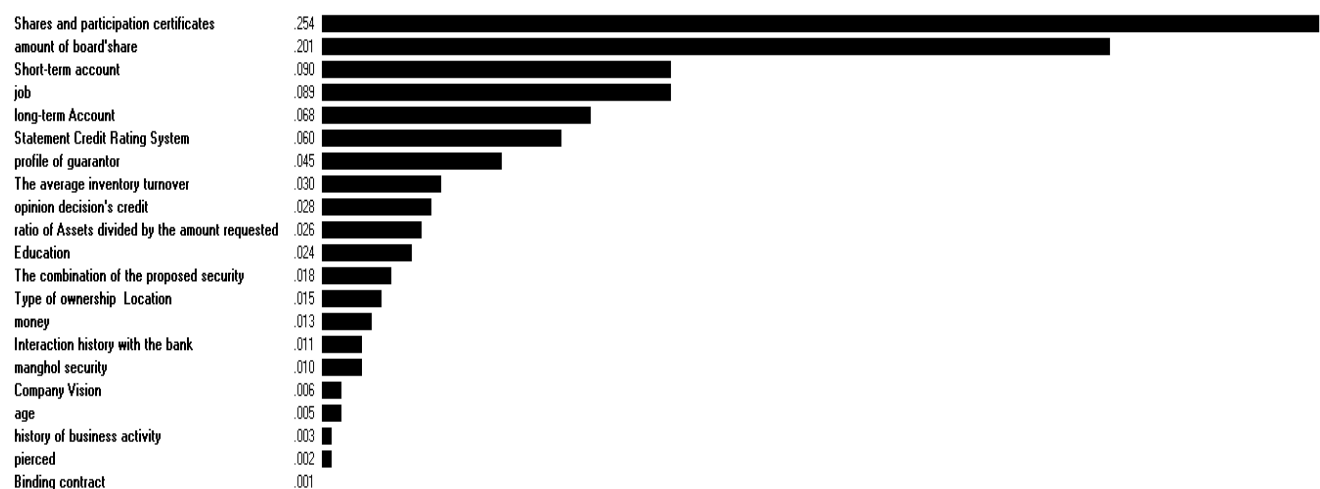


Figure 6. Range importance of sub-criteria for Industry & Mine bank

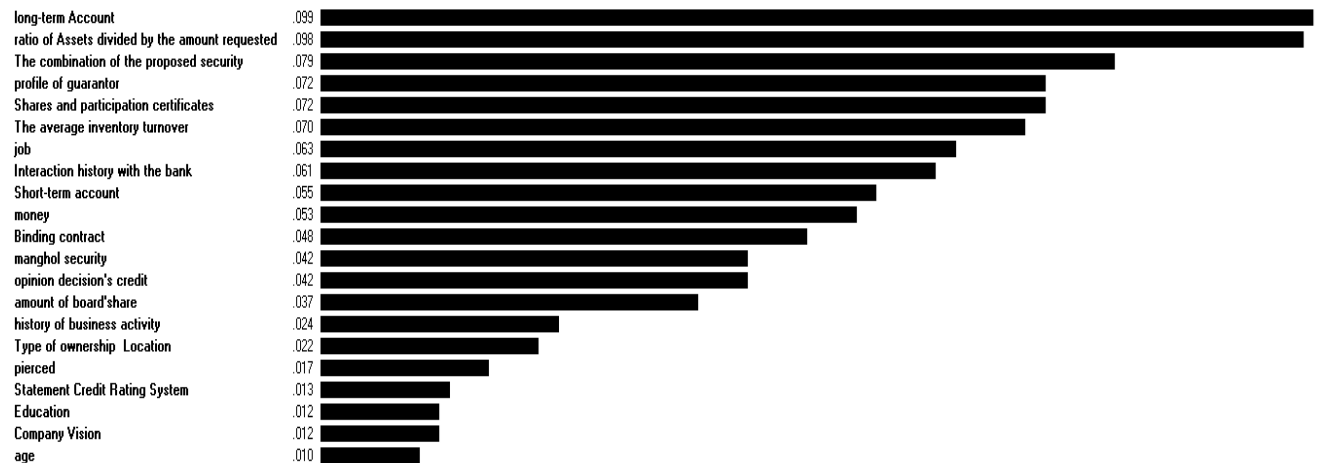


Figure 7. Combine Range importance of sub-criteria for banks

Conclusions

Considering the importance of crediting banks clients and reviewing research results, we suggest that in credit evaluation of customers, priority and degree of importance of criteria be considered and more important and more effective dimensions of credit risk of customers be studied in a more attentive way. Bank customers can be aware of their bank perspective using the mentioned information and in order to receive credit in an easier way they can consider these types of criteria to proceed. Bank authorities have the possibility to reconsider the rating system in their credit evaluation model using different degrees of importance studied in this paper. Future researchers are advised to develop a comprehensive and general model to credit rate the customers with attention to degree of importance of these criteria.

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