

## Study on the Relationship of the Facilities Granted to the Credit Risk of Tejarat Bank in Mazandaran

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### ABSTRACT

The aim of this study was to investigate the relationship of facilities granted to the credit risk of Tejarat bank in Mazandaran. For this purpose, from 442 cases real customers during the years 2002 to 2011 that used credit facilities. In this study, after analyzing the credit file of each of the samples, the explanatory variables have been evaluated and the final model was fitted by these variables. Then to assess the relative credit risk of each type of facility, each of them individually were tested. Possibility obtained from the model that is separate from each type of facility, respectively, show that there is a significant effect between type of facilities and credit risk.

**KEYWORDS:** credit risk, credit facilities, bank Tejarat Mazandaran.

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### 1. INTRODUCTION AND STATEMENT OF PROBLEM

Efficient management of credit risk is an important part of a holistic approach to risk management and is essential to the bank's long-term success. Since credit risk, remains as well as the source of the problem the world's leading banks, the banks and auditors should be able to learn valuable lessons from past experiences. As it requires banks consider sufficient capital to compensate for the risk that they face, and should have necessary awareness about the need for recognition, measurement, monitoring and control their credit risk.

Banks in the process of their business activities face with many risks that could impact on their performance. Success or failure of banks in risk management is closely related to planning. Risks are the results of uncertainty fluctuations in profitability or losses. Though there is an extensive and comparable focus to the traditionally qualitative assessment of risk, in order to achieve quantitative risk management, it is necessary to gain a precise definition for different risks. Conclusion functions and triggers risk regulator makes it a risk management measures put in service.

The high rate of bad loans in the banking system today is indicative of high credit risk and market risk and liquidity that banks faced them. Although banks try to control risk within the organization, but something that cannot be ignored, is a high percentage of the risk and consequences of its future. Basel Committee (2000) credit risk as "the possibility of non-compliance with obligations of the Bank in accordance with the time agreed by the receiving facility" is defined. Credit risk, possibility of the risk of non-repayment or delayed payment of principal and interest of loans granted by banks and other debt instruments by customers. This risk arises when the possibility of failure of payment obligations exist for the period that have been agreed. Credit risk depends on the quality of assets and the possibility of fuel it.

In Iran, according to the country's economic structure and for reasons such as underdevelopment of capital markets and other non-bank networks, the banking network is the responsibility of financing the real economy. A significant volume of credit facilities or outstanding Banks showed lack of application of appropriate models to measure credit risk and risk management systems in the country's banking network. Despite the importance of credit risk in the activity of banks and financial institutions, it seems that recently, efforts are emerging. Indicators that today consider for determining possibility of non-repayment obligations of the customer are based on identification of experts and credit committees and don't have defined form and transparent manner. Using the Index ranking companies in terms of credit risk in some developed countries and in developing countries is common and in these countries, exist the institutions that evaluate and determine credit risk-assessment and financial firms issued.

Therefore, due to the introduction and importance of the issue that mentioned in the previous section, most important research aims are to investigate the relationship between types of facilities on the credit risk of Tejarat bank in Mazandaran.

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1 Committee overseeing banking regulations (Basel) in 1974, senior representatives of observer countries, Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, Netherlands, Sweden, Switzerland, United Kingdom and the United States. Each quarterly the BIS Basel Committee in Switzerland come together. An international organization of central banks of the Member States in the monitoring of international banking standards and the promotion of cooperation and sharing of monetary and financial aid (for more information refer to: Basel 2000, principles for credit risk management, bank payments international, Switzerland, July).

## 2. History of research

For the first time design a model for measuring and rating the credit risk on the bonds was done in 1909 by John Murray (Broom, 1995). Today, each of the institutions such as Moody's and S & P use reliable grading of a particular methodology for grading bonds and other credit instruments. Many similarities bank credit facilities led to a bond credit rating of credit risk, the risk of non-repayment of the principal and interest of loans recorded considered by some researchers (Case, 2003).

Among these is the Fisher's study in 1936, which is built on the basis of credit scoring methods and assessment system of credit demand is first noted. This paper investigates the detection of groups in a society based on five criteria experimental manufacturer's occupation, income, financial statements (balance sheet), guarantor or collateral and repayment of loans received from banks and payment information (Fisher, 1936). Durand in 1941 to determine the important parameters from Commenters point of view of the facilities and features that were statistically significant, based on the results of discriminant analysis and Fisher were used. The theoretical framework of this study was to determine the importance of improved parameters was validated. He also offered suggestions for analyzing credit risk. Therefore, he can consider as founder of credit scoring systems at the present time. He in his study used scoring system for the classification of people seeking loans to buy second-hand car. He used the parameters of the job applicant's job or facilities, number of years in the job, the number of years spent in the current address, bank accounts, life insurance and savings letters, gender and monthly installments of now concerned. Actually his model is the first form of lending from experience that credit institutions can use it as a model to make decisions without the involvement of credit experts (facilities). In this period, several companies of empirical knowledge experts of credit for customer credit scoring used the decision rules set by them was considered as the first expert systems (Durand 1941). Starting late fifties decade, a greater number of firms willing to improve credit scoring systems and the need to have updated information. Pioneering work in this field, the largest and most famous of the company at the time the company was founded Fair Isaac in 1956.

The results Ahmad Nad Ali (2008) showed that the fuzzy decision tree better results in terms of resolution of customers than the traditional trees and logistic regression statistical methods, Bayesian networks and neural networks. But has less accuracy compared to the genetic tree models and support vector machine (Nad Ali,2008).

Lotfi (2007) in the doctoral thesis entitled "Credit Risk Modeling in Keshavarzi Bank, approach logit models, profit and neural networks using data from 640 corporate clients of the Keshavarzi Bank, set out to design a model for credit scoring model using 3 logit, profit and the neural networks. The results indicate that between 3 review models, logit model have predict accurate than the default and non-default customers compare to other models (Lotfi,2007). Eskandari (2006) in his dissertation, entitled "Actual customer credit ratings of banks to raise credit health of the banking system", to assess credit risk. Statistics such as job stability, security, and income earned from our customers and using logit regression model to calculate the probability of default of each customer facility and then to rank the Saman Bank's real customers. Thus, the ranking of real customers, rate of the credit risk is reduced to a considerable degree. (Eskandari, 2006) showed thatresult from X5 estimation of the maximum share in the company in terms of discriminant analysis, resulting in the separation of companies high or low risk. The results Frrish and Laffer (2001) showed that strength testis satisfactory. in this study use annual data in this study was 10 years and showed the correlation of default increases, the probability of loss increases the probability of loss is very low and small (Frrish, 2001). The results Hyun and Klimir (2006) showed that the detection parameters and specifications Applicants should be part of the credit rating. It was also shown that the use of credit scoring models in the field of business and there is a significant relationship between using model and lending.

### 2-1. Research hypotheses

1. There is a significant relationship between installment sales credit facilities and the credit risk of the applicant (the probability of loan default).
2. There is a significant relationship between the facilities granted civic participation and the degree of credit risk applicants (loan default probability).
3. There is a significant relationship between reward of credit facilities and the credit risk of the applicants (the probability of loan default).

4. There is a significant relationship between the partnership facilities and the degree of credit risk applicants (loan default probability).

### 3. RESEARCH METHODOLOGY

Present study, is a survey descriptive research. Since the results can be used practical, research is an applied research. The population included all individuals' real people that have received facilities from the province of Tejarat Bank in period between the years 200 to 2011. Among the types of bank facilities, four facilities in partnership, civil partnership, installment sales and credit facilities branch is presented mainly composed deals were selected. Tools for collecting data and information are to refer to the documents (December, 1994 collected from the branches of Tejarat bank in Mazandaran. A pre-test was conducted to determine the sample size and in end 442 of the case study and the data obtained were analyzed and a simple random sampling method is used with the appropriate assignment Research to select the desired sample, and then processing the data and finally data analysis software Eviews and Excel is used.

#### 4. Research findings

##### 4-1. The descriptive findings

In this study, four kinds of civic facilities, installment sales, reward and partnership has been considered. According to the findings, the highest share of non-repayment of loan installments and then, respectively, civic participation, and partnership are presented in the lower ranks.

According to a description, by increasing the interest rate, the share of overdue loans in total credit facilities of 21.1% in the interest rate of 4% increase to 28.6% increase in the rate of 23%.

In terms of variable gender, the study of 367 men and 75 were women. In this study, patients according to age divided into two groups of people over 40 and have been categorized under 40 years old with a code with zero code.

In this study, four kinds of civic facilities, installment sales, reward and partnership have been considered. Same-as you can see in Table 1, the highest share of non-repayment of loan installments in population and the samples were obtained and then, civic engagement, reward and partnership are lower.

Table1. Variable type of facilities in collected samples

Facility type Percent	Civic participant	Sales	partnership	Reward
<b>Total</b>	49	350	20	23
<b>The number of deferred</b>	21	129	6	6

##### 4-2. Analytical findings

The basic model studied with four types of facilities including facilitate civic participation, partnership, sales and reward. To assess the relative credit risk of each type of facility, each of them were tested separately the best estimate and the estimate for the 4 types of loans report as follows elderly.

##### 4-2-1. The hypothesis test 1

There is a significant relationship between sales and the credit risk of applicants for credit facilities (loan default probability). In Table 2. The best model is given sales facility. As we see, the probability statistic is equal to 0.000298 significant at 99% level. The coefficients for variables such as age, duration of loan, rate of interest and a significant penalty rate and other factors are not significant.

Table 2 shows the final results of logit regression estimation based on sales facilities

Possibility	Hypothesis Testing	A significant factor	Statistics Z	standard deviation	Coefficient B.	Dependent variables
0.047	approval	significant	1.979	0.268	0.5318	Age
0.537	disapproval		0.616	0.000	0.0005	Average account
0.112	disapproval		1.589	0.539	0.8579	Facilities during
0.004	disapproval	significant	-2.877	0.247	-0.7130	education
0.895	disapproval	Non-significant	0.131	0.284	0.0372	Customer experience
0.387	disapproval	Non-significant	-0.865	0.24	-0.2291	The facilities
0.319	disapproval	Non-significant	-0.994	0.003	-0.0037	Penalty rate
0.018	disapproval	Significant significant	2.362	0.054	0.1286	Interest rates

0.000	disapproval	Non-significant	3.46	0.310	1.0771	Gender	Rate
0.731	disapproval	Non-significant	-0.342	0.36	-0.1152	The value of collateral	Sex
0.454	disapproval	Non-significant	0.747	0.03	0.0024		Value
0.055			-1.91	1.177	-2.253	Coefficient Fixed	C

Number of obs	350
McFadden R-squared	0.075064
LR statistic	34.5154
Prob(LR statistic)	0.000298

#### 4-2-2. The hypothesis test 2

The final effects of the proposed model is based on sales facility can be said that interest rate has the greatest influence in a positive direction. Also, if the age of the applicant as a rank increases, the probability of defaults will rise as much as 36%. Time convenience factor indicates that an increase of one unit in the facility, the probability of default is reduced by 56%. The proposed model for facilitating participation is in Table 3 below. According to the model of 0.009654 Partnership Facility that is to say that it was significant at the 99% level and McFadden statistics show that only 34% of commercial bank credit risk factors identified in the Bank's.

If the age has the greatest influence and to strengthen the possibility of default, so that older people, the likelihood of defaults will increase to as much as 1.64 units. Also the duration of default of repayment reduce the probability of lacking repayment to 1.52.

Table3. The final results of logit regression estimation based on the Civil Partnership Facility

Possibility	Hypothesis Testing	A significant factor	Statistics Z	standard deviation	Coefficient B.	Dependent variables	
0.110	disapproval	Non-significant	1.595	1.405	2.241		Age
0.139	disapproval	Non-significant	1.477	0.006	0.010	Average account	Avr
0.018	disapproval	Non-significant	-2.358	1.186	-2.798	Facilities during	Dur
0.589	disapproval	Non-significant	0.539	1.265	0.683	education	Edu
0.209	disapproval	Non-significant	-1.253	1.338	-1.678	Customer experience	Expr
0.511	disapproval	Non-significant	-0.656	0.435	-0.285	The facilities	Loan
0.070	disapproval	Non-significant	-1.810	0.185	-0.336	Penalty rate	Pendr
0.556	disapproval	Non-significant	0.587	1.524	0.895	Interest rates	Rate
0.968	disapproval	Non-significant	-0.039	1.492	-0.059	Gender	Sex
0.272		Non-significant	1.098	0.388	0.426	The value of collateral	Value
0.084			1.727	3.937	6.803		C

Number of obs	49
McFadden R-squared	0.3483
LR statistic	23.31125
Prob(LR statistic)	0.009654

#### 4-2-3. The third hypothesis test

There is a significant relationship between reward credit facilities and the credit risk of the applicants (the probability of loan default).

The best model of facilities is presented in Table. As you can see the model at 99% is significant. Statistics MacFadden says, 82% of the Bank's credit risk can be estimates with identified variable, but none of the variables are not significant factors it is clear in the effects of the proposed model.

Table4. Final results of estimate logit regression model presented by facilities

Possibility	Hypothesis Testing	A significant factor	Statistics Z	standard deviation	Coefficient B.	Dependent variables
0.430	disapproval	Non-significant	0.787	6.16	4.857	Age
0.399	disapproval	Non-significant	0.841	14.9	12.55	Collat
0.158	disapproval	Non-significant	-1.40	0.01	-0.017	Dur
0.929	disapproval	Non-significant	-0.08	0.42	-0.037	Expr
0.625	disapproval	Non-significant	-0.48	13.81	-6.745	Loan
0.205	disapproval	Non-significant	1.26	53.94	68.31	Rate
0.205	disapproval	Non-significant	1.26	21.87	27.68	Value
0.206			-1.26	451.09	-569.3	coefficient Constant

Number of obs                    442  
 McFadden R-squared            0.821  
 LR statistic                      21.68  
 Prob(LR statistic)              0.002875

**4-2-4. The fourth hypothesis test**

There is a significant relationship between partnership facilities and the credit risk of the applicants (the probability of loan default). The best partnership facility model is in Table 5 below. The results of the model indicate that the probability statistic model is not significant because it is 0.434 and is larger than 0.01. The final effect can also be seen in the proposed model, the model coefficients are significant variables.

Table5. The final results of logit regression estimation based on relationship facility

Possibility	Hypothesis Testing	A significant factor	Statistics Z	standard deviation	Coefficient B.	Dependent variables
0.944	disapproval	Non-significant	0.07	1.701	0.119	Age
0.230	disapproval	Non-significant	1.20	0.03	0.036	Loan
0.343	disapproval	Non-significant	-0.94	2.083	-1.974	Rate
0.530	disapproval	Non-significant	-0.62	0.004	-0.002	Value
0.530			-1.96	2.02	-2.32	Constant coefficient

Number of obs                    442  
 McFadden R-squared            0.155161  
 LR statistic                      3.791288  
 Prob(LR statistic)              0.434988

**DISCUSSION AND CONCLUSION**

Due to limited financial resources and facilities available to Banks, evaluation of repayment capability of customers before lending to them, is one of the most important challenges facing the country's banking system. In other words, credit risk related to any of the borrowers must pay before it is validated and the appropriateness of the decision. So, to determine the credit risk of customers lending to customers is very important.

In this study, with using a logit model to study the factors affecting the credit risk of Tejarat bank. According to the best model, we found kind of facility has significant relationship with the probability of default of loans (credit risk).

**Arabmazar** and **Rointaan** in their study identified 36 financial and qualitative variables. Among the variables using logit regression analysis of 17 variables that had a significant effect on credit risk creditworthy and non-creditworthy clients and the distinction between the two groups were selected for the final model was fitted to them by showing them the results, a logit model to estimate the factors influencing credit risk potential is high.

Arameshi in his research concluded that gender variable, income, type of residence, marital status, age and employment status of clients on the probability of default on the loan and the repayment period of loans affected and variables in our sample are ineffective.

Lotfi has designed a model to credit rating enjoying 3 logit models, probit and neural networks. The results show that the 3 review model, logit model predicts more accurate than other models of default and non-default customers.

Mohammad Khan came to the conclusion logistic regression model to predict the likely failure to properly Banks customers and samr-Lomsho's tests can provide a good test model as well.

Soltani found there is a significant relationship between credits and loans and between loans individual characteristics.

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