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Bank credit risk management to corporate customers in the province DEA approach

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Abstract: **-**the purpose of this study was to identify the factors affecting export credit risk Credit risk is the applicant's legal clients. Companies surveyed in the study, during the period of one year since 2011 to 2012 have been selected, based on the way an exhaustive review of the literature related issues, in the form of research library for collecting data and information from the financial statements and the balance sheets of companies in which the Saderat Bank receiving facilities have been used. The results have shown the efficiency of companies receiving facility DEA is using a sample of 49 companies , only 9 companies are effective , but they are ineffective, the remaining companies

Keywords: - *Credit risk management, efficiency, data envelopment analysis (DEA), the Bank*

I. INTRODUCTION

Investigation reveals that the international economic system .The level of investment and economic development are closely related .This means that countries with efficient pattern allocation of capital to different sectors of economy, economic development, and thus often have a higher social welfare (Gutman, 2000).
The bank seeks to companies that own facilitieswhile having a low risk of returns commensurate with the benefits they have facilities. This is achieved when the banks were able to identify both natural and legal persons and their credit customers based on their ability and willingness to repay the full and timely financial and non-financial liabilities, using criteria appropriate class to sort.(1999, John).
Despite the importance of credit risk in the banking and financial institutions, it seems thatCoherent and organized movement for the creation of credit risk models has been done .For example, in the financial markets on the one hand, the lack of credit risk indicators and rating agencies clearly feel it is and on the other

Facilities to customers in theCoherent and orderly process for determining credit risk and ranking them based on risk and credit ceilings, are not consideredAnd now experts credit Committee to determine their pay . In this case, having an efficient risk model, not only in the field of credit decisions and will facilitate obtaining documentationit will cause followed by the country's banking system and a model of efficiency in allocating capital to different sectors of the economy will benefit.According to the description above present research , Credit risk model to identify factors affecting the credit ratings of clients seeking legal Facilities in saderat bank of Mazandaran province withusingthe DEA method.

II. RESEARCH HISTORY

1-George Asif (2010):In his research on the technical efficiency of Saudi banks, this study examines the technical efficiency of Saudi banks . Period 2007-1999 is used as input data for these study three cases: 1) the total employed labor force, 2) fixed assets 3) Total deposits and outputs include: 1) loans to customers, 2) securities 3) loans between banking is. Results indicate that the technical efficiency of Saudi banks from 2004 onwards has improved, which includes banks that are operating with foreign capital is too.
2- Thinner Lin (2009):In his research, the use of DEA in analyzing a bank's operational efficiency in Taiwanin this study, 117 subsidiaries of Bank of Taiwan in 2006 as samples and using the DEA,Enable banks to assess operational efficiency, have been evaluated.Variables used in this study consists of four inputs : 1) the number of employees, 2) interest expense , 3) the amount deposited in non- vision 4) deposits and four outcomes : 1)

the amount of the mortgage payment , 2) Income 3) Get operation 4) interest income is. The results show that overall technical efficiency of banks in the sample had a low level, so that the various branches of its average 8/54 and their average scale efficiency level of 82 %.

3-Mohammad Bahreini (2009): In their study comparing the economic performance of public and private banks in Iran using DEA (inclusive) data (DEA), is discussed. In this analysis two intermediate attitude and the attitude of the income approach is used to interface with value added approach. In the first approach Inputs include 1) Deposits, 2) labor and 3) capital and output are different loans (total outstanding loans and partnerships) and the second approach is to deposit a given output and other variables are defined as the first approach. One approach to calculating performance shows that the economic performance of public banks than private banks. In the second approach is considered the economic efficiency of private banks is higher than state-owned banks.

III. RESEARCH METHODOLOGY

The research method is type of Analytical With the aim of Applied. The results of the data collected with the help of information and documents that the Export Development Bank of Iran Export Bank facilities have received, is derived forAnd using the results, the analysis is done .To analyze the collected data to Excel and SPSS software outcomes and DEA Solver can be used .Finally, using linear programming and data envelopment analysis is used to evaluate the performance of branches .

Variables in this study include:

Variables in DEA (input and output)

A) Output:

Equity to total assets, current assets, fixed assets, ROA, license and experience refunds

B) Input: Short-term debt to total assets ratio of total debt to total asset s.

The study population research survey Bank balance sheet and financial documents of 49 companies that have received loans from the saderatbank extracted.

IV. RESEARCH QUESTION

A key question :

1-Does the financial indicators and non-financial indicators of risk, credit risk impact ?

2 - What is the bank's corporate customer's credit rating?

Results and findings :

1-5-review the research question using methods

Analyze data using CCR model

Table 4-5: Level of corporate efficiency and input and output weights using CCR model.

$U(O_5)$	$U(O_4)$	$U(O_3)$	$U(O_2)$	$U(O_1)$	$V(I_2)$	$V(I_1)$	Efficiency	
0.276896	0	0.49349	0	0	0.328744	5.44E-02	0.28	1
7.90E-02	0	1.570247	0	2.40E-03	5.52E-03	1.194558	0.10	2
0.946035	4.56E-02	0.21731	4.20E-03	4.10E-02	6.02E-03	18.59665	1	3
9.99E-02	0	1.986656	0	3.03E-03	6.98E-03	1.511339	0.13	4
0.473896	0.160347	1.130253	5.66E-05	0	0.753024	0.1245	0.65	5
0	0.901299	5.518667	0	9.70E-03	0.937959	3.046283	0.90	6
0.984102	9.64E-02	0.459123	1.20E-02	0.112913	2.87E-04	45.33172	1	7
0.208266	6.01E-02	0	3.36E-05	0	0.308839	6.09E-02	0.26	8
0.370803	0.10729	0	6.00E-05	1.92E-03	0.550098	0.109824	0.47	9
6.45E-02	0.00368	1.364988	0	2.08E-03	4.25E-03	1.038941	0.23	10
0.765773	0.230352	0.419436	1.16E-04	4.05E-03	1.154719	0.221675	1	11
0.384011	0.110788	0	6.20E-05	0	0.569452	0.112211	0.49	12
6.23E-02	3.08E-03	0	0	0	4.08E-04	1.152992	0.0623	13
0.448664	0.15181	1.070075	5.36E-05	0	0.712931	0.117872	0.61	14
0.25806	0.087317	0.61548	3.08E-05	0	0.410059	6.78E-02	0.354	15
0.374765	0.126805	0.893822	4.48E-05	0	0.595504	9.85E-02	0.51	16
0.104866	0	0.186876	9.36E-06	0	0.124505	2.06E-02	0.10	17
0.452613	0.153623	1.082614	5.41E-05	2.54E-03	0.719651	0.120812	0.62	18
0.556348	0.160508	0	8.99E-05	0	0.825011	0.16257	0.71	19

0.373792	0.12687	0.894081	4.47E-05	2.10E-03	0.594327	9.98E-02	0.53	20
0.377006	0	0.671843	3.37E-05	0	0.447611	7.40E-02	0.39	21
0.33036	0.11178	0.787917	3.95E-05	0	0.524945	8.68E-02	0.45	22
0.086467	0.829028	5.278949	1.14E-04	8.49E-04	0.861769	3.188316	1	23
0.341422	0.115523	0.814299	4.08E-05	0	0.542522	0.089697	0.46	24
0	0.337539	2.066754	0	3.63E-03	0.351268	1.14084	0.34	25
0.528115	0	0.941128	4.72E-05	0	0.627021	0.103668	0.54	26
0	0.210431	1.288474	0	2.26E-03	0.21899	0.711233	0.21	27
0.251246	0	0	3.15E-05	0	0.289152	5.70E-02	0.25	28
0.195226	6.61E-02	0.465619	2.33E-05	0	0.310216	5.13E-02	0.27	29
0.401214	0	0	5.03E-05	0	0.461747	9.10E-02	0.40	30
0.305596	8.82E-02	0	4.94E-05	0	0.453169	8.93E-02	0.40	31
0	0	22.67574	0	0	8.10E-06	0.865733	1	32
0.303075	0.102548	0.722841	3.62E-05	0	0.481588	7.96E-02	0.41	33
0.30042	0.140546	0	0	0	0.507472	0.100033	0.44	34
0	0.215314	0	0	2.42E-03	0.221341	0.730575	0.21	35
0.448701	0	0.799608	4.01E-05	0	0.532734	8.81E-02	0.45	36
0.902578	0.902578	4.297989	0.124039	1.147003	2.69E-03	427.5174	1	37
0.325334	9.39E-02	0	5.25E-05	0	0.482439	9.51E-02	0.41	38
0.499827	0.499827	2.380128	6.61E-04	3.81E-02	4.155469	0.146291	1	39
0	0	0	1.75E-06	1.19E-04	4.40E-06	1.303524	1	40
0.398091	0.135117	0.952202	4.76E-05	2.23E-03	0.632962	0.106259	0.61	41
0.359845	0.121757	0.858237	4.30E-05	0	0.571795	9.45E-02	0.50	42
0.286977	0.097101	0.684447	3.43E-05	0	0.456009	7.54E-02	0.39	43
0.259732	8.79E-02	0.619467	3.10E-05	0	0.412716	6.82E-02	0.35	44
0.391932	0.113073	0	6.33E-05	0	0.581198	0.114526	0.50	45
0	0.219938	1.346686	0	2.37E-03	0.228884	0.743365	0.22	46
0.544322	0.107548	1.47455	1.26E-04	0	0.872776	0	0.82	47
0.417745	0.141348	0.996332	4.99E-05	0	0.6638	0.109749	0.66	48
7.77E-03	7.77E-03	3.70E-02	1.03E-05	9.66E-03	2.32E-05	3.595611	1	49

As shown in the tableninecompanies out of 49 companies have higher efficiencyand effectively known .The average performance of the whole company, 52/0 and a standard deviation of 28/0 and a minimum efficiency of 13 companies with about 06/0 is obtained

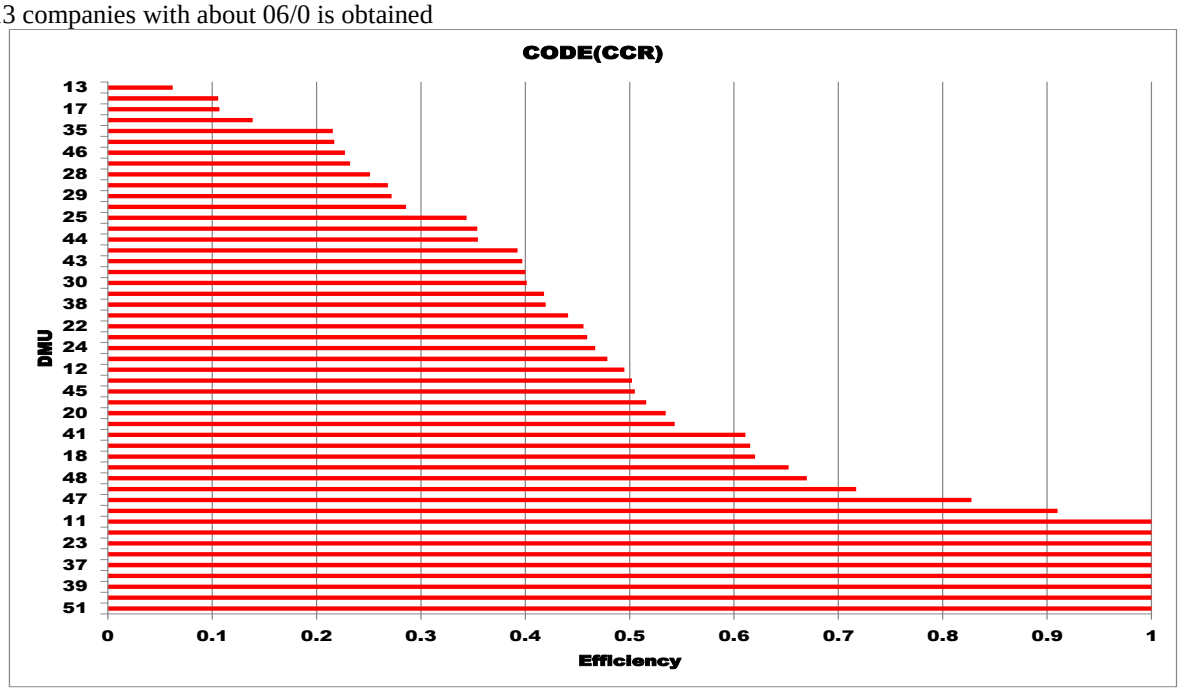

Figure 4-1: efficacy models using CCR

Figure 4-1, the order of arrangement of the efficient units (now No. 51) to the inertia of the useful (now No. 13) shows. And according to the model CCR 9 units (company) is to be expressed .

Table 4-6 details the input excess and output shortfall

Repayment history	Business License S^+	ROA S^+	Current assets to fixed assets	Equity to total assets S^+	Ratio of total debt to total assets S^-	Short-term loans to total assets S^-	Efficiency	
0	0	0	0.19848	0.149336	0	0	0.2857	1
0	0.963842	0	0.361784	0	0	0	0.1057	2
0	0	0	0	0	0	0	1	3
0	0.965543	0	0.394991	0	0	0	0.1388	4
0	0	0	0	1.48E-02	0	0	0.6523	5
4.15E-03	0	0	503.8375	0	0	0	0.909	6
0	0	0	0	0	0	0	1	7
0	0	3.98E-03	0	0.109485	0	0	0.2683	8
0	0	7.47E-04	0	0	0	0	0.4785	9
0	0	0	0.446213	0	0	0	0.2321	10
0	0	0	0	0	0	0	1	11
0	0	6.11E-03	0	0.142404	0	0	0.4949	12
0	0	3.15E-04	2.458385	0.728108	0	0	6.23E-02	13
0	0	0	0	0.167063	0	0	0.6154	14
0	0	0	0	0.228728	0	0	0.354	15
0	0	0	0	0.08757	0	0	0.5158	16
0	1	0	0	2.04E-02	0	0	0.107007	17
0	0	0	0	0	0	0	0.6202	18
0	0	1.19E-03	0	6.44E-02	0	0	0.716992	19
0	0	0	0	0	0	0	0.534607	20
0	0	0	0	0.137932	0	0	0.392641	21
0	0	0	0	0.227783	0	0	0.455828	22
0	0	0	0	0	0	0	1	23
0	0	0	0	0.240209	0	0	0.467057	24
1.12E-02	0	0	493.1931	0	0	0	0.343863	25
0	0	0	0	9.86E-02	0	0	0.54326	26
0.022343	0	0	585.5605	0	0	0	0.21703	27
0	0	6.25E-03	0	3.11E-02	0	0	0.251263	28
0	0	0	0	3.50E-02	0	0	0.272002	29
0	0	3.32E-03	0	0.136453	0	0	0.401528	30
0	0	4.11E-03	0	3.62E-02	0	0	0.400019	31
0	0	0	0	0	0	0	1	32
0	0	0	0	1.10E-02	0	0	0.417969	33
0	0	2.64E-04	2.21E-02	0.160424	0	0	0.440966	34
6.23E-04	0	3.72E-04	566.2115	0	0	0	0.215512	35
0	0	0	0	0.144131	0	0	0.459312	36
0	0	0	0	0	0	0	1	37
0	0	3.53E-03	0	0.192708	0	0	0.419522	38
0	0	0	0	0	0	0	1	39
0	0	0	0	0	0	0	1	40
0	0	0	0	0	0	0	0.611	41
0	0	0	0	6.68E-02	0	0	0.50224	42
0	0	0	0	0.190025	0	0	0.39714	43
0	0	0	0	0.215277	0	0	0.354603	44
0	0	5.37E-03	0	0.108646	0	0	0.505038	45
2.42E-02	0	0	608.3658	0	0	0	0.227221	46
0	0	0	0	0.162436	0	2.52E-02	0.827452	47
0	0	0	0	0.174729	0	0	0.66974	48
0	0	0	0	0	0	0	1	49

Due to the fact the province of companies out there that has the same level of consumer input into an efficient unit .DEA is able tothe rate of change in inputs anda Consumer outcome in each of inefficient firms is computed using the reference to company performance .These companies are focusing on this aspect to increase their efficiency and to achieve the level of a functional unit .Reference set of inefficient units is shown in Table 4-3.

Table 4-7: Reference unit each inefficient unit

Reference Unit	Inefficient units
1,23,32	1
3,23,32,51	2
51,32,23,3	3
11,23,32,40	4
32,37,39,51	5
11,23,40	6
11,23,40,51	7
3,23,32,51,37	8
11,23,40,32	9
3,7	10
11,23,40,32	11
11,23,40,32	12
11,23,40,32	13
11,23,40,32	14
11,23,40,32,51	15
11,23,40	16
11,23,40,32,51	17
11,23,40,32	18
11,23,40,32	19
11,23,40,32	20
32,37,39,51	21
11,23,40,32	22
32,37,39,51	23
11,23,40	24
11,23,40,32	25
11,23,40,32	26
11,23,40,32	27
11,23,40,32	28
11,23,40,32	29
11,23,40,32	30
11,23,40,32	31
37	32
11,23,40,32,51	33
11,23,40,32,51	34
11,23,40,32	35
11,23,40,32	36
11,23,40,32	37
11,23,40	38
32,37,39,51	39
11,23,40	40
11,23,40,32	41

The results of the review of the Bank's performance to corporate customers using data envelopment analysis

Performance calculated in accordance with law firms in both output-based and input based BSI results for the year 1390-1391 is as follows

The company has an excellent performance of the 49 companies are known to work. The average performance of the whole company, 52/0 and a standard deviation of 28/0 and the minimum efficiency for about 06/0 is

obtainedto obtain optimum performance and efficient entry of firms, it now references, efficient company .It is a combination of inputs, input the desired amount of non-functional company, is determined to reach the efficiency frontier. For example ,Short-term debt to total assets ratio of inefficient companies 1 to about 13/1 and the desired value of about 32/0 is., this means a 72% deviation from the optimal level. In other words, the company must first be converted into an efficient unit is about 71/0 ratio decreased.

V. RECOMMENDATIONS BASED ON RESEARCH RESULTS

1-Use of efficient portfolio companies, to invest, to reduce investment risk and optimal portfolio choice .
2-Using the model results (DEA) in order to raise the efficiency of the company and the company's weaknesses and recognize the impact of improving the level of efficiency of the company's portfolio is efficient .
3 -Sequential prediction and change the degree of credit risk transfer credit facilities to their customers who granted the right measures to prevent the event of non-repayment..

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