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Low interest loans in micro businesses and its impact on social entrepreneurship using data envelopment analysis

S. Tavakoli [1], M.A. Namin [*2], N. Khabiri[3]

[1]Department of Financial Management, Safadasht Branch, Islamic Azad University, Tehran, Iran.
[2] Department of Mathematics, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran.
[3]Department of Management, Safadasht Branch, Islamic Azad University, Tehran, Iran

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Abstract
Evaluating the efficiency of low-fee loans in small businesses and comparing them with each other can be a support for strategic planning. Banks and escape from economic inflation. One of the methods of measuring efficiency is data coverage analysis. In this research, the indicators affecting the performance of low-fee loans have been researched and identified, and then the researched samples have been estimated. In three parts, the evaluation of the public institution of Resalat (Qarz Al-Hasna Resalat Bank) which is active in paying microloans has been done and in order to measure the impact of microloans on business creation, it has been compared with 9 other banks. In fact, the purpose of this research is to measure the efficiency of micro-bank facilities and its impact on the creation of micro- and home-based businesses and to identify indicators that affect micro-businesses. At the end, the steps of the research are described with a practical example.

Keywords: Micro loans, Micro Businesses, Social Entrepreneurship, Data Envelopment Analysis.

[*] Email: AhadzadehNamin@yahoo.com

1. Introduction

In order to complete the structure of the capitalist system, we must introduce a new type of business to the world; A type that is based on different dimensions of human mind. We call this new type of business social business. (Younes et al. (2012) and Younes et al. (2018)) One of the questions that is always raised when explaining the concept of social business is: Where and how does social business capital come from? Sponsors are mostly looking for the credit they create in Qarz al-Hasna to be gifted to the members. For example, an organization or body that becomes a credit sponsor and declares that the credit resulting from its capital savings in the Qarz al-Hasna account will be used to donate facilities to members. (Younes et al. (2016) and Resalat University of Social Development (2014). In our country, steps have gone far beyond Qarz-ul-Hosna funds and banks with only Qarz-ul-Hosna activities under the name "Qarz-ul-Hosna Bank" have also been formed. These banks are only engaged in Qarz Al-Hasna activities. (Resalat Social Development University (1400)). Microcredits means disbursement of unsecured and guaranteed loans with low fees to support small and income-generating businesses with the aim of eliminating poverty among the poor. But today, many organizations mistakenly give microcredit to people who are not poor and for other purposes, and some even gain a lot of profits by closing the interest rate of 100% to this facility. Unfortunately, or fortunately, until now, the performance of banks or institutions has not been measured by the method of data coverage analysis, and the field for research in this field is fully prepared, and the information obtained in other researches in the field of microloans and its impact on creating jobs Small and domestic is just a series of statistical information. Therefore, this research is organized as follows: after the introduction, in the second part we have discussed the research method and definition of the model used in this research, in the third part we have analyzed and in the fourth part we have discussed the conclusion. Is. Since the results of mathematical models were used in this research, we do not have any hypothesis. However, part of the work was done statistically.

2. materials and methods

In this research, considering that the main purpose of the research is to investigate a subject in the field method, it can be said that the mentioned research is in the field of applied research. On the other hand, considering that library study methods and field methods such as questionnaires were used in this research, it can be stated that the current research is a descriptive-surveillance research based on the nature and method of data collection. (Hafazinia (1389))

We can use data coverage analysis indicators to evaluate the efficiency and productivity of Qarz al-Hasna banks and other commercial banks and their impact on the creation of small and home businesses, because they are evaluated by scientific publications at the same time as successful techniques. The performance of decision-making units is known. (Tohidlo (2017) and Giasalone et al. (2020))

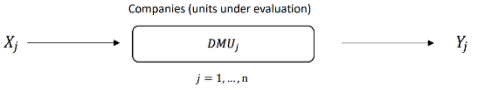

Figure (1): Conceptual form of units under evaluation

We assume that the value of n units under evaluation $DMU_j, j = 1,...,n$ are assumed (Figure (1)), that the j-th unit with consumption of input m input $X_j = (x_{1j},...,x_{mj})$ number s produces the output $Y_j = (y_{1i},...,y_{si})$. Assume

that the input and output weights are respectively as $V = v_1,...,v_m$ and $U = u_1,...,u_s$ The efficiency of the j-th unit $j = 1,...,n$ is defined as follows:

$$e_j = \frac{"output\ weighed\ sum"}{"input\ weighed\ sum"} = \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \qquad (1)$$

In order to calculate the efficiency of the p-th unit of the CCR model, the input nature of the multiplicative form has been presented by Charnes et al. (1978), which is as follows.

$$e_p = \frac{\sum_{r=1}^{s} u_r y_{rp}}{\sum_{i=1}^{m} v_i x_{ip}} \qquad (2)$$

$$s.t \quad \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \le 1, \qquad j = 1,...,n$$

$$u_r, v_i \ge 0,\ i = 1,...,m,\ r = 1,...,s.$$

The above fractional model by changing $\sum_{i=1}^{m} v_i x_{ij} = t > 0$, $v_i = tv_i$ and $u_r = tu_r$ variables become the linear model (3).

$$e_p = \max \sum_{r=1}^{s} u_r y_{rp}$$

$$s.t \quad \sum_{i=1}^{m} v_i v_{ip} = 1 \qquad (3)$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} \le 0,\ j = 1,...,n$$

$$u_r, v_i \ge 0,\ i = 1,...,m,\ r = 1,...,s.$$

The basic model of data coverage analysis has different types. One of the basic models is the CCR model. This model has many applications, among which we can refer to the articles of Tohidlo (2017) and Gyasalone et al. (2020). If the optimal value of model (3) in the evaluation of unit P is equal to one, unit P is called efficient, otherwise unit p is inefficient. This efficiency criterion can be a criterion for ranking units.

3. Practical example

Three projects have been analyzed in this section.

3.1 The first project

In order to measure the current performance of Resalat People's Organization (Qarz Al-Hasneh Resalat Loan Bank) in creating the business of members and their livelihood, and in this regard, effective indicators have been identified. These indices include 10 input indices and 5 output indices, whose titles are as follows:

The input indicators are: 1- Rate of facilities (I1) 2- Legality of facilities (I2) 3- Recognition and membership in social cooperation center (I3) 4- Recognition and membership in social entrepreneurship cores (I4) 5- Recognition and Membership in social trust cores (I5) 6- Digitization of the bank (I6) 7- Working efficiency of the bank (I7) 8- Loan amount ceiling (I8) 9- Guarantee documents (I9) 10- Performance from the perspective of members (I10).

The output indicators are: 1- The number of loans received (1O) 2- The amount of loans received (2O) 3- Membership in the social entrepreneurship center (membership with one and non-membership with zero) (3O) 4- The number of people introduced for Membership (4O) 5- Loan fee (5O).

The sample questionnaire prepared to determine the values of 10 input indicators and 5 output indicators is given in Appendix (1). Tables (1) and (2) show a limited number of input and output index

values extracted from the questionnaire. The questionnaire was distributed and completed among 200 clients and members of Qarz Al-Hasna Resalat Bank. The answers to the questions of this questionnaire were based on the Likert scale and its validity and reliability were measured.

Cronbach's alpha values for 10 input indicators are given in Table (3).

Table (1): An example of the input index values extracted from the questionnaire

DMU_j	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10
1	**5**	**5**	**4**	**5**	**5**	**5**	**5**	**4**	**5**	**5**
2	3	5	4	1	4	5	4	3	5	4
3	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
⋮										
200	**4**	**4**	**3**	**5**	**5**	**5**	**4**	**5**	**5**	**5**

Table (2): An example of output indicators

Lack of membership in the Entrepreneurship Center	**Membership in the Entrepreneurship Center**
0	**1**

Row	**The number of entrepreneurial loans received**	**The amount of loans received (in millions of Tomans)**	**Membership in the center of social entrepreneurship**	**The number of referrals for membership**	**Wage**
DMU_j	**O1**	**O2**	**O3**	**O4**	**O5**
1	1	50	1	10	0.02
2	2	100	1	2	0.02
3	1	50	1	3	0.02
⋮					
200	3	150	1	10	0.02

Table (3): Cronbach's alpha values of the reliability of the questionnaire

Cronbach's alpha	variable number
0.763	10
variable	**Cronbach's alpha value after removing the variable**
Period 1	0.72
Period 2	0.759
Period 3	0.726
Period 4	0.714
Period 5	0.751
Period 6	0.751
Period 7	0.75
Number 8	0.751
Chapter 9	0.77
Period 10	0.726

Table (4): efficiency values of the units

DMUJ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
θ_j^α	0.9063	1	0.7692	0.8722	0.7824	0.9362	1	0.7889	0.9	0.875	1	0.7692	0.7753	0.8462	0.95	1	0.7975	1	1	0.7923
DMUJ	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
θ_j^α	0.931	1	0.7692	1	1	1	0.7813	1	1	1	1	1	1	0.8774	0.7857	1	0.867	0.7819	0.7692	1
DMUJ	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
θ_j^α	1	0.9032	0.8542	0.9	0.8333	0.7914	0.9028	0.8078	1	0.9	0.9837	1	0.7914	1	0.7857	0.8776	0.9	0.9407	1	0.8364
DMUJ	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
θ_j^α	0.9138	0.8995	1	0.7857	0.7857	0.8852	0.9538	1	0.8235	0.9933	1	0.9	0.7966	1	0.9435	1	1	1	0.8246	1
DMUJ	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
θ_j^α	1	1	1	1	1	1	0.9437	1	0.8	0.7914	1	1	1	0.9032	0.855	0.9048	0.8431	0.8039	0.8667	0.8889
DMUJ	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
θ_j^α	1	0.7945	0.9167	0.9091	0.7887	1	0.8333	0.8776	0.7818	1	0.9697	0.7968	0.9868	0.881	1	0.7818	0.7833	1	0.9773	1
DMUJ	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
θ_j^α	0.7918	1	1	0.7864	0.7945	1	0.7818	1	1	1	0.8018	1	0.9912	1	1	1	1	1	0.8	1
DMUJ	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
θ_j^α	1	0.8	0.8	1	1	0.9167	1	1	1	0.8	0.8623	0.8	1	0.8	0.9167	1	0.8049	1	0.9333	0.9167
DMUJ	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
θ_j^α	0.8	0.8	1	0.8	0.9167	0.875	1	0.8	0.8	0.8462	1	1	0.8	1	1	0.8	1	1	0.8	1
DMUJ	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
θ_j^α	1	1	0.7895	1	1	1	1	1	1	0.8629	1	1	0.8767	0.8112	0.7796	1	1	1	0.8621	1

Table (5): The results of the analyses obtained

A total of 200 people	excellent(1)	Good (0.9 (to 0.9999)	Acceptable (0.8 to (0.8999)	Need more effort (0.7 to 0.7999)
	65	38	34	63
	33%	19%	17%	32%

We have used model (2) to evaluate 200 people. Since the value of efficiency in each person is a number between zero and one, to ignore the efficiency table, the result of it is divided into four classes: excellent (efficiency value 1), good (efficiency between 0.9 and 0.9999), acceptable (0.80 and 0.8999). And the need for more effort (less than 0.8) is given as a percentage in table (5). Table (4) is the result of the analysis of the CCR model written in the Games program. The values reported in the θ_j^α column represent the efficiency index of each unit (persons). The complete results are given in the appendix (3). The result of performance data analysis is described in table (5).

3.2 second project

In the second project, our goal was to measure the performance of Qarz al-Hasna Resalat Bank against 9 other commercial banks. According to the identification of influential indicators, this project includes 7 input indicators and 6 output indicators. The answers to the questions of this questionnaire are based on the Likert scale and its validity and reliability have been measured. Table No. 8 shows Cronbach's alpha values for 7 input indicators. In this way, a 7-question questionnaire was designed and distributed in the branches of the selected banks. In each branch of the selected banks, 20 series of questionnaires were distributed, and a total of 200 answer sheets were distributed in all the branches. The sample questionnaire is given in Appendix (2).

The input indicators are:

1) Facility rate (I1)
2) Legality of the facility (I2)
3) Digitization of the bank (I3)
4) Loan amount ceiling (I4)
5) Guarantee documents (I5)

6) Performance from the perspective of members (I6)
7) Customer satisfaction with the desired bank (I7).

The output indicators are:

1) Number of received loans (1O)
2) Filing process (0 traditional and 1 digital) (2O)
3) Blocked amount (0 has, 1 does not) (3O)
4) Repayment period per month 4O)
5) Fees for loans (5O)
6) The need for a salary deduction letter (0 has and 1 does not) (6O). Tables (6) and (7) show values of the input and output indices of several banks.

Table (6): An example of the input index values extracted from the questionnaire

Banks	DMU_j	I1	I2	I3	I4	I5	I6	I7
First Bank	**1**	**5**	**3**	**5**	**5**	**5**	**5**	**3**
(Commercial)	**2**	**5**	**5**	**5**	**5**	**5**	**5**	**3**
⋮	⋮							
10th Bank	**200**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table (7): An example of the output indicators extracted from the questionnaire

Row	Received loan amount (in millions of Tomans)	Filing process	Blocked amount (in millions of Tomans)	Repayment period in months	loan fee	Need a salary deduction letter
DMU_j	O1	O2	O3	O4	O5	O6
1	50	0	0	36	1	0
2	50	0	0	36	1	0
…						
200	30	0	0	36	1	1

Table (8): Guide to fees

Table of fees	1	2	3	4	5
	18%	**17%**	**10%**	**4%**	**2%**

Table (9): Cronbach's alpha values of the reliability of the questionnaire

Cronbach's alpha value	Number of variables
0.8	7
Variable	Cronbach's alpha value after removing the variable
Variable 1	0.726
Variable 2	0.663

Variable 3	0.726
Variable 7	0.853

The point that should be mentioned is that we have given a score of 1 to 5 to each of the fees according to table (8). The lower the fees, the more points they have received.

The values related to Cronbach's alpha reliability of the questionnaire are given in table (9). We have considered people whose efficiency was number one to be excellent. Table (10) shows the performance results.

Table (10): The results of the analyses obtained

Name of banks	**The number of people with a score of one**	**Percent**
National Bank	8	4%
Sepah Bank	7	3.50%
Export	7	3.50%
Mellat Bank	7	3.50%
City	7	3.50%
agricultural Bank	7	3.50%
Sina Bank	6	3%
Prosperity	8	4%
Performance of Qarz al-Hasna Resalat Bank	20	10.00%
The performance of Karz Al-Hasneh Mehr Bank of Iran	20	10.00%
Total	97	48.50%

In table (10), in the first column, the names of the researched banks are given. In the second column, the number of people to whom the bank has given facilities are given (in fact, the efficiency and effectiveness of the bank in paying the facilities) and in the third column, the percentage. The level of efficiency and effectiveness of banks in paying facilities to people is given.

3.3 Third project

Our goal in carrying out the third project is to measure the performance of Qarz al-Hasna Resalat Bank from 1398 to 1401. In 1398, Qarz al-Hasna Resalat Bank collected its physical branches and started its activities as a digital bank, and in fact, payment facilities This bank was conducted digitally and offline. In this section, the input indicators are the number of customers from the beginning of 2018 to the last quarter of 2018 in each season of the year. The output index is the number of facilities paid from 1398 to the last quarter of 1401 in each season of the year. Table No. 10 is the input values and Table No. 11 is the output values. Based on this information, we have implemented model (3) and checked the results.

Table (11): Input and output values in the third project

Row	Number of members (I1)	Number of members (I1)
The first quarter of 2018	2650000	59,000
The second quarter of 2018	2750000	68,000
The third quarter of 2018	2800000	77,000
Fourth quarter of 2018	2950000	84,000
The first quarter of 2019	3212500	98,000
The second quarter of 2019	3580000	112,000
The third quarter of 2019	3900000	126,000
Fourth quarter of 2019	4000000	139,000
The first quarter of 1400	4150000	154,000
The second quarter of 1400	4350000	170,000
The third quarter of 1400	4750000	182,000
The fourth quarter of 1400	4800000	196,000
The first quarter of 1401	4925000	221,000
The second quarter of 1401	5150000	251,000
The third quarter of 1401	5475000	277,000
The fourth quarter of 1401	5700000	306,000

Table (12): Efficiency results of the third project

DMU_j	θ_j^{α}(Performance index)	V1(Input index weight)	Output index) U1(weight
1	0.427	2.106	2.106
2	0.4716	2.031	2.031
3	0.522	1.995	1.995
4	0.5393	1.896	1.896
5	0.5758	1.743	1.743
6	0.5893	1.567	1.567
7	0.6075	1.44	1.44
8	0.6523	1.405	1.405
9	0.6954	1.355	1.355
10	0.7315	1.293	1.293
11	0.7171	1.186	1.186
12	0.7634	1.174	1.174
13	0.8377	1.144	1.144
14	0.9089	1.095	1.095
15	0.943	1.03	1.03
16	1	0.99	0.99

In table (11), values (I1) are as input values and values (O1) are as output values. The results of the analysis of input and output indicators in the third project are shown in table (12). θ_j^{α} denotes the efficiency performance index in every three months of the year, V1 is the weight of the input index and V2 is the weight of the output index. In the above table, the first column shows the three-month intervals from 1998 to 1401. In the second column, the performance index of the public institution of Resalat (Qarz al-Hasna Resalat Bank) is stated to have an upward trend, which is

the same in reality. The third and fourth columns indicate the order of input and output weight is indicative. As can be seen in table (12), the results (performance index) have an upward trend from 1398 to 1401.

4. Conclusion

According to the research that has been carried out, even at a time when society's inflation is high, but people still consider the cheapness of facilities to be an important issue in starting a business, this can be seen in the statistics and results obtained in the first and second projects. It is quite evident. We have come to the conclusion that there is an inverse relationship between the facility fee and starting a business, that is, the lower the facility fee, the greater the desire to start a business and the more successful it is. In addition, we came to the conclusion that commercial banks have performed poorly in paying low-fee loans, this is clearly evident in the second project, and even the people of the community have understood this and receive most of their facilities from Qarz al-Hasaneh banks. And even the results in the third project show that the resources of Qarz al-Hasna banks have grown a lot and this indicates the good relationship of people with this kind of banks.

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