

BENEFICIARIES' ATTITUDE TOWARDS EDUCATION LOAN – AN ANALYSIS THROUGH FUZZY MATRICES

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ABSTRACT

In this article the authors attempted to analyze the group of beneficiaries having maximum level of favourable attitude towards the education loan using fuzzy matrices.

INTRODUCTION

Fuzzy refers to 'Vagueness'. Vagueness is quite common in case of qualitative data which plays a dominant role in real life situations. To describe such situations Zadeh [4] introduced the theory of fuzzy sets. In system models based on fuzzy sets one often uses fuzzy matrices. Fuzzy matrices were introduced by Thomason [3].

“ A Fuzzy matrix is a matrix with elements having values in the fuzzy interval”. In this article the unit interval $[0,1]$ and the interval $[-1,1]$ are called fuzzy intervals [4]

Education, especially the higher education, contributes much for the socio-economic development of our country. Education for all is perceived as the national goal to be achieved and efforts are being taken by launching various schemes by both the Central and State governments. But increasing cost of education caused by liberal privatization of higher education in India resulted in financial hardships to students who are economically poor but academically bright to pursue higher education. In addition to the different scholarships offered by the government, the education loan scheme launched by the commercial banks based on the directions from the government raised the hope of the needy people that their dream of higher education is going to be a true. Education loans are provided by all commercial banks to deserving students for pursuing graduation, post-graduation and professional courses.

A maximum of Rs 10 lakhs is sanctioned for studies in India and it is Rs.20 lakhs for studies in abroad. Education loans upto four lakh rupees require neither margin money nor collateral security. In case of higher loan amount, margin money of 5% is insisted for studies in India and it is 15% for studies in abroad. The borrowers need not repay any amount during the moratorium period. The borrowers are expected to repay loan installments only six months after getting job or one year after the course is completed whichever happens earlier. The education loan interest waiver scheme announced by the central government in the union budget 2009-2010 received warm reception with gratitude from the student community, especially the economically poor section. Under this scheme the students whose family income is below four lakh rupees need not pay interest pertaining to the moratorium period. The statistics reveal a steady growth in the number of beneficiaries. Till March,2009 education loan totaling Rs.24,000 crore had been disbursed to 16 lakh students across the country. It is forecasted to touch Rs.50,000 crore within 2015(Union budget 2009-10).

METHODOLOGY

To analyze the attitude of student beneficiaries towards the education loan, a study was conducted in Madurai city, Tamilnadu during March, 2011. A sample of 100 respondents was drawn at random from the students pursuing professional courses in colleges situated in and around Madurai city. A pre-tested interview schedule was administered and response was solicited to assess the attitude towards education loan. Response was solicited for six statements, all positive about education loan. Each statement has been given five degrees of agreement or disagreement and assigned score value to each degree(Strongly agree – 5 ; Agree – 4 ; Neither agree nor disagree – 3 ; Disagree – 2 ; Strongly disagree – 1). The respondents who assigned score value of

either 4 or 5 were considered for the development of fuzzy matrix model. Though a number of factors contribute for the favorable attitude, the amount of loan received has been taken for further analysis.

Using fuzzy matrices the authors attempted to analyze the group of respondents (based on amount of loan availed) having maximum level of favorable attitude towards the education loan.

APPLICATION OF FUZZY MATRICES

The statements S1,S2.....S6 were taken as columns of the matrix and the three class intervals of loan amount(in Rs.'0000) were taken as the rows of matrix. The number of respondents of each group whose score values to the statements were found as either 4 or 5 were counted for each statement and formed initial raw data matrix called Time Dependent Matrix [1] as shown below:

Loan amt (in Rs.'0000)	S1	S2	S3	S4	S5	S6
3 – 10	10	12	17	20	22	18
10 – 20	18	18	24	31	28	29
20 - 32	12	16	21	12	19	13

The initial raw data matrix has been converted into the Average Time Dependent Matrix [1] (a_{ij})by dividing each entry with the width of the respective class – interval.

ATD Matrix

Loan amt (in Rs.'0000)	S1	S2	S3	S4	S5	S6
3 – 10	1.25	1.5	2.13	2.5	2.75	2.25
10 – 20	1.8	1.8	2.4	3.1	2.8	2.9
20 - 32	1	1.33	1.75	1	1.58	1.08

The average(μ_j) and Standard Deviation (σ_j) of every column were worked out as follows:

Average	1.35	1.54	2.09	2.20	2.38	2.08
Std.Dev	0.41	0.24	0.33	1.08	0.69	0.92

Using the average (μ_j), Standard Deviation (σ_j) and a parameter α from the interval [0,1] a fuzzy matrix called the Refined Time Dependent Data Matrix (RTD Matrix) [1] was formed. The matrix with entries e_{ij}, where e_{ij} ∈ { -1, 0, 1 }, was formed using the following formula [1]:

- If a_{ij} ≤ (μ_j – α * σ_j) then e_{ij} = -1
- else if a_{ij} ∈ (μ_j – α * σ_j, μ_j + α * σ_j) then e_{ij} = 0
- else if a_{ij} ≥ (μ_j + α * σ_j) then e_{ij} = 1, where a_{ij},s are entries of Average Time Dependent Matrix

By varying the parameter α ∈ [0, 1], any number of Refined Time Dependent Data Matrices can be obtained. Three of such matrices obtained were as follows:

RTD Matrix for α = 0.15 Row sum matrix

$$\begin{pmatrix} -1 & -1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 \end{pmatrix} \begin{pmatrix} -1 \\ 6 \\ -6 \end{pmatrix}$$

RTD Matrix for α = 0.25 Row sum matrix

$$\begin{pmatrix} 0 & 0 & 0 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 \end{pmatrix} \begin{pmatrix} 2 \\ 6 \\ -6 \end{pmatrix}$$

RTD Matrix for α = 0.45 Row sum matrix

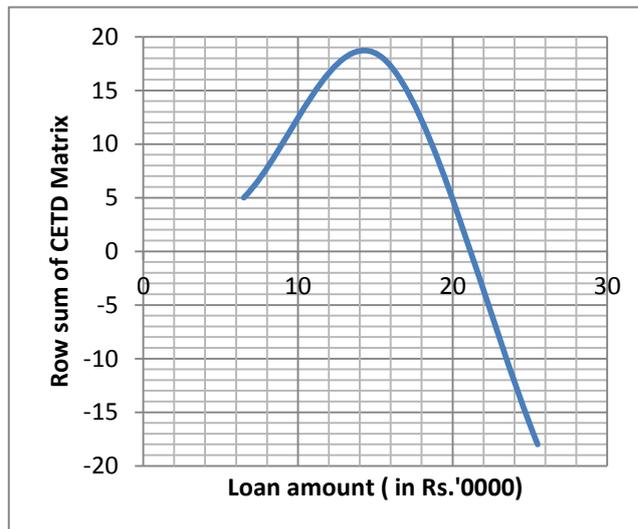
$$\begin{pmatrix} 0 & 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 \end{pmatrix} \begin{pmatrix} 2 \\ 6 \\ -6 \end{pmatrix}$$

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By combining all these three matrices, the Combined Effect Time Dependent Data Matrix (CETD matrix) [1] which gives the cumulative effect of all these entries was obtained as follows:

CETD Matrix	Row sum matrix
$\begin{pmatrix} -1 & -1 & 0 & 2 & 3 & 2 \\ 3 & 3 & 3 & 3 & 3 & 3 \\ -3 & -3 & -3 & -3 & -3 & -3 \end{pmatrix}$	$\begin{pmatrix} 5 \\ 18 \\ -18 \end{pmatrix}$

Using Chart Wizard of Excel software, a graph was drawn taking row sum matrix of CETD Matrix along the Y axis and the loan amount along the X axis. The following graph clearly exhibited the group of respondents (based on amount of loan availed) having maximum level of favorable attitude towards the education loan.



RESULT

It was found that the group of respondents who availed loan ranging between Rs.1,30,000 and Rs.1,55,000 had maximum level of favorable attitude towards the education loan.

CONCLUSION

Like amount of loan, each and every other contributing factors like parental income, age of the parents, number of educating children in the family and so on can be considered and analyzed for decision making purpose. Application of fuzzy matrix model in social science research will help solve many complicated issues in the real world.

REFERENCES

1. Vasantha Kandasamy, W.B., Florentin Smarandache and Ilanthenral, K., "Elementary Fuzzy Matrix Theory and Fuzzy Models for Social Scientists", Automaton Publishers, Los Angeles, 2007.
2. Vasantha Kandasamy, W.B., Florentin Smarandache and Ilanthenral, K., "Special Fuzzy Matrices for Social Scientists", Info Lean Quest Publishers, Ann Arbor, 2007.
3. Thomason, M.G., Convergence of powers of a fuzzy matrix, J.Math.Anal.Appl.57 (1977) 476-480
4. Zadeh, L.A., "Fuzzy Sets", Information and Control, 8 (1965) 338-353.