



## A study on the Urban Cooperative Banks Success and growth in Vellore District – Statistical Analysis

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**Abstract** - Urban co-operative banks ranked a very significant position in the Indian banking sector. Competent management is pre-requisite for the success of any organization. At present highly competitive and globalized business environment, there is an urgent need of professional management for the successful controlling and managing the affairs of the urban co-operative banks. Increasing political hindrance in co-operatives has also affected the strong growth of the cooperative organization. In order to make the management of these banks professional and managing the affairs of these banks on scientific lines, there are several institutions which are directly or indirectly connected involved in imparting education and training to all levels of management. It is hoped that the State Governments will not delay acceptance of the recommendations made by the RBI. In view of the financial sector reforms and de-regulation, Urban Co-operative Banking Sector should be right away freed from restrictive provisions of co-operative Acts so as to make them self-reliant and self-supporting. The purpose of this paper examines the growth and success of the urban cooperative banks in Vellore District through statistical analysis.

**Key words** - significant, urgent, imparting, restrictive.

### I. INTRODUCTION

The Urban Co-operative Banks (UCB's) have to play an important role in meeting the requirements of small traders, weavers, agriculturists and other lower and middle income group of people. Recently, the UCB's have been directed to concentrate their efforts towards the industrial development and other priority sectors of the economy.

In order to achieve the above objectives, the UCB's have to make proper credit planning and available financial resources must be allocated properly for such purpose. The progress of the Urban Co-operative Banks (UCB's) consists a detailed and systematic assessment of its selective variables like share capital, deposits, loans and advances etc. In this chapter, the researcher wants to predict the role of the UCB's in future through time series analysis, Correlation co-efficient, Chi-square test, Multiple regression and Analysis of variance. Such a growth analysis involves the collection, observation and analysis of data relating to the selective variables. Growth analysis helps in understanding not only the past achievements but also the future aspirations of the UCB's. It leads to the comparison of the actual performance with that of the expected. The researcher has selected the following statistical tools to evaluate the growth analysis of UCB's.

### II. CORRELATION COEFFICIENT

The statistical tool with the help of which these relationships between two or more than two variables are studied is called correlation. The measure of correlation,

called the correlation coefficient, summarises in one figure the direction and degree of correlation. Thus correlation analysis refers to the techniques used in measuring the closeness of the relationship between variables.

A very simple definition of correlation is that given by A.M. Tuttle, "An analysis of the co-variation of two or more variables is usually called correlation".

The problem of analysing the relation between different series can be broken down into three steps:

1. Determining whether a relation exists and, if it does, measuring it.
2. Testing whether it is significant.
3. Establishing the cause and effect relation, if any.

Correlation analysis helps in determining the degree of relationship between two or more variables-it does not tell us anything about cause and effect relationship. Even a high degree of correlation does not necessarily mean that a relationship of cause and effect exists between the variables or, simply stated, correlation does not necessarily imply causation of functional relationship though the existence of causation always implies correlation.

1. *Karl Pearson's Co-Efficient of Correlation*: Of the several mathematical method of measuring correlation, the Karl Pearson's method, popularly known as Pearsonian co-efficient of correlation, it must widely used in practice. The Pearsonian co-efficient of correlation is denoted by the symbol  $r$ .

$$r = \frac{\sum dx dy}{\sqrt{\sum dx^2 \times \sum dy^2}}$$

The Correlation co-efficient between some of the variables like Membership, Share Capital, Deposits, Loans and Advances, Profit and Reserve Funds, Working capital and Loans issued of the UCB's can be studied through the method of Karl Pearson's co-efficient of correlation. With the help of the correlation analysis of the selective variables for the period 2003-04 to 2008-09, the study may be able to predict the future growth of the UCB's.

### III. CHI-SQUARE ANALYSIS

Chi-square test developed by Prof. Fisher is considered an important test. Chi-square symbolically written as  $\chi^2$  (pronounced as ki square) is a statistical measure with the help of which it is possible to assess the significance of the difference between the observed frequencies and the expected frequencies obtained from some hypothetical universe.

In order that Chi-square set may be applicable, both the frequencies must be grouped in the same way and the theoretical distribution must be adjusted to give the same total frequency which is equal to that of observed frequencies.

Chi - Square test is used as a statistical tool in this project. Also it invokes no assumption about the form of original distribution form which the observations are made. In this method we test if two attributes considered are dependent or not.

- Null Hypothesis  $H_0$  : Attributes are independent.
- Alternative Hypothesis  $H_1$ : Attributes are not independent.
- Degree of freedom : n-1

**Chi – Square Formula**  $\chi^2 = \frac{\sum (O_i - E_i)^2}{E_i}$

If calculated value is less than value at given degrees of freedom we accept  $H_0$ , else we reject  $H_0$ . The Chi-square test of the variables like Membership, Share Capital, Deposits, Loans and Advances, Profit and Reserve Funds, Working capital and Loans issued of the UCB's can be studied through the Prof. Fisher's Chi-square test of goodness of fit. With the help of the chi-square test of the selective variables for the period 2003-04 to 2008-09, the study may be able to predict the future growth of the UCB's.

### IV. MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis is a statistical tool in which a mathematical model is developed to predict a dependent variable by two or independent variable or in which at least one predictor is non-linear. The principle advantage of multiple regression is that it allows us to utilize more of the information available to us to estimate the dependent variable. Multiple regression analysis will also enable us to fit curves as well as lines. In addition, in multiple regression analysis, we can look at each of the individual independent variable and

test whether it contributes significantly to the way the regression describes the data.

Multiple regression analysis represents a logical extension of two variable regression analysis. Instead of a single independent variable, two or more independent variables are used to estimate the values of a dependent variable. However, the fundamental concepts in the analysis remain the same. Just as in the analysis involving the dependent and only one independent variable.

*1. The Multiple Regression Equation:* We begin the analysis by using the method of least squares to obtain the best fitting three variable linear regression equation of the form given in equation (1). In the two variable regression problems, the method of least squares was used to obtain the best fitting straight line.

Analogously in the present problem, the method of least squares is used to obtain the best-fitting plane. In a three variable regression problem, the points can be plotted in three dimensions, along the  $X_1$ ,  $X_2$ , and  $Y$  axes.

The best fitting plane would pass through the points, with some falling above and some below the plane in such a way that  $\sum (y - \bar{y})^2$  is minimum. Now three normal equations must be solved to determine the values of  $a_1$ ,  $b_1$ , and  $b_2$ .

Calculation:

$$\begin{aligned} \sum Y &= na + b_1 \sum X_1 + b_2 \sum X_2 \\ \sum X_1 Y &= a \sum X_1 + b_1 \sum X_1^2 + b_2 \sum X_1 X_2 \\ \sum X_2 Y &= a \sum X_2 + b_1 \sum X_1 X_2 + b_2 \sum X_2^2 \end{aligned}$$

The Multiple regression analysis of the variables like Deposits, Loans issued, Loans and Advances, Reserve fund, Owned funds and Overdues of the UCB's can be studied through Multiple regression equation. With the help of the multiple regression analysis of the selective variables for the period 2003-04 to 2008-09, the study may be able to predict the future growth of the UCB's.

#### 1. MEMBERSHIP

TABLE 1

STATEMENT SHOWING THE CORRELATION BETWEEN MEMBERSHIP AND SHARE CAPITAL OF UCB'S IN VELLORE DISTRICT

Members (X)	Share Capital (Rs. in Lakhs) (Y)	dx (X-A)	dy (Y-A)	dx <sup>2</sup>	dy <sup>2</sup>	dx dy
53,423	186	-1,665	-7	27,72,225	49	11,655
54,151	188	-937	-5	8,77,969	25	4,685
54,623	191	-465	-2	2,16,225	4	930
55,928	194	840	1	7,05,600	1	840
56,176	199	1,088	6	11,83,744	36	6,528
56,224	200	1,136	7	12,90,496	49	7,952
<b>3,30,525</b>	<b>1,158</b>			<b>70,46,259</b>	<b>164</b>	<b>32,590</b>

**SOURCE:** Annual Reports, the UCB's in Vellore District.

$$\bar{X} = \frac{\sum X}{N} = \frac{3,30,525}{6} = 55,088$$

$$\bar{Y} = \frac{\sum Y}{N} = \frac{1,158}{6} = 193$$

$$r = \frac{\sum dxdy}{\sqrt{\sum dx^2 \times \sum dy^2}} = \frac{32590}{\sqrt{70,46,259 \times 164}}$$

$$r = \frac{32,590}{33,993.92} = 0.9587$$

TABLE 2

STATEMENT SHOWING THE CORRELATION BETWEEN MEMBERSHIP AND LOANS ISSUED OF UCB'S IN VELLORE DISTRICT

Members (X)	Loans issued (Rs. in lakhs) (Y)	Dx (X-A)	dy (Y-A)	dx <sup>2</sup>	dy <sup>2</sup>	dxdy
53,423	4,863	-1,665	-172	27,72,22	29,584	2,86,38
54,151	4,901	-937	-134	8,77,969	17,956	1,25,558
54,623	4,972	-465	-63	2,16,225	3,969	29,295
55,928	5,098	890	63	7,05,600	3,969	56,070
56,176	5,132	1,088	97	11,83,744	9,409	1,05,536
56,224	5,243	1,136	208	12,90,496	43,264	2,36,288
3,30,525	30,209			70,46,259	108151	839,127

**SOURCE:** Annual Reports, the UCB's in Vellore District.

$$\bar{X} = \frac{\sum X}{N} = \frac{3,30,525}{6} = 55,088$$

$$\bar{Y} = \frac{\sum Y}{N} = \frac{30,209}{6} = 5,035$$

TABLE 4

STATEMENT SHOWING THE MULTIPLE REGRESSION ANALYSIS OF DEPOSIT(Y), LOANS ISSUED(X<sub>1</sub>) & LOANS AND ADVANCES(X<sub>2</sub>) OF UCB'S IN VELLORE DISTRICT

year	Y	X <sub>1</sub>	X <sub>2</sub>	X <sub>1</sub> Y	X <sub>2</sub> Y	X <sub>1</sub> X <sub>2</sub>	Y <sup>2</sup>	X <sub>1</sub> <sup>2</sup>	X <sub>2</sub> <sup>2</sup>
1	53.46	48.63	41.23	2599.75	2204.15	2005.01	2857.97	2364.87	1699.91
2	53.98	49.01	43.18	2645.56	2330.85	2116.25	2913.84	2401.98	1864.51
3	54.16	49.72	45.81	2692.83	2481.06	2277.67	2933.30	2472.07	2098.56
4	54.89	50.98	47.41	2798.29	2602.33	2416.96	3012.91	2598.96	2247.70
5	55.23	51.32	48.73	2834.40	2691.35	2500.82	3050.35	2633.74	2374.61
6	56.98	52.43	50.12	2987.46	2855.83	2627.29	3246.72	2748.90	2512.01
<b>N=6</b>	<b>328.7</b>	<b>302.09</b>	<b>276.48</b>	<b>16558.29</b>	<b>15165.57</b>	<b>13944</b>	<b>18015.09</b>	<b>15220.52</b>	<b>12797.30</b>
<b>Mean</b>	<b>54.78</b>	<b>50.35</b>	<b>46.08</b>						

**SOURCE:** Annual Reports, the UCB's in Vellore District.

$$r = \frac{\sum dxdy}{\sqrt{\sum dx^2 \times \sum dy^2}} = \frac{8,39,127}{\sqrt{70,46,259 \times 1,08,151}} = \frac{8,39,127}{8,72,939} = 0.9612$$

TABLE 3

STATEMENT SHOWING THE CHI-SQUARE TEST OF MEMBERSHIP OF UCB'S IN VELLORE DISTRICT

Year	O	E	(O-E)	(O-E) <sup>2</sup>	$\frac{(O-E)^2}{E}$
1	53,423	55,088	-1,665	27,72,225	50.32
2	54,151	55,088	-937	8,77,969	15.93
3	54,623	55,088	-465	2,16,225	3.92
4	55,928	55,088	840	7,05,600	12.80
5	56,176	55,088	1,080	11,83,744	21.48
6	56,224	55,088	1,136	12,90,496	23.40
<b>N=6</b>	<b>3,30,525</b>				<b>127.87</b>

**SOURCE:** Annual Reports, the UCB's in Vellore District  
The expected frequency for each membership = 3,30,525/6 = 55,088

$$\chi^2 = \frac{\sum (O_i - E_i)^2}{E_i} = 127.87$$

Number of degree of freedom = 6-1 = 5

Table value of  $\chi^2$  for 5 d.f at 5% level = 11.07

**Conclusion:** The calculated value  $\chi^2$  is greater than the table value, the difference between the observed and expected frequencies is taken as significant. Therefore, H<sub>0</sub> is rejected at 5% level. Hence the membership can be regarded as significant.

**Calculation**

$$Y = a + b_1 x_1 + b_2 x_2$$

$$\sum Y = na + b_1 \sum X_1 + b_2 \sum X_2$$

$$\sum X_1 Y = a \sum X_1 + b_1 \sum X_1^2 + b_2 \sum X_1 X_2$$

$$\sum X_2 Y = a \sum X_2 + b_1 \sum X_1 X_2 + b_2 \sum X_2^2$$

**Solution**

$$328.78 = 6a + 302.09b_1 + 276.48b_2$$

$$16558.29 = 302.09a + 15220.52b_1 + 13944b_2$$

$$15165.57 = 276.48a + 13944b_1 + 12797.30b_2$$

$$a = 94.99783$$

$$b_1 = -1.68494$$

$$b_2 = 0.96860$$

**V. CONCLUSION**

The overall financial performance of the UCB's in all fronts namely, Membership, Share Capital, Deposits, Loans and Advances, Profit and Reserve Funds, Working capital, Overdues, Loans issued etc., are showing a significantly and undistributing trend through the application of different statistical tools applied in the study.

Therefore it may be undoubtedly concluded that the UCB's are the road of progress. This also clear that, the UCB's is

enjoying a predominant position in the banking industry occupied in eighth place in the banking institution serving in Vellore District.

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