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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio," Ohio State University.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Economic and Political Weekly, Viewed on July 05, 2011 http://epw.in/user/viewabstract.jsp

A STUDY ON THE OPERATIOINAL EFFICIENCY OF THE TAICO BANK THROUGH VARIOUS MODELS

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ABSTRACT

The Tamilnadu Industrial Cooperative Bank (TAICO Bank) started functioning from November, 1962 to cater fully to the credit needs of various industrial cooperatives and small scale industries. It has undergone various changes from its inception to till date. Therefore, an attempt has been made in this paper to know the factors influencing net profit through multiple linear regression analysis, to identify the transitional changes in the working of TAICO Bank through a Cluster Model, to understand the periodic changes in the functioning of the bank through Tukey Hamming Model, to evaluate the operational efficiency and time series changes through Auto Regressive Integrated Moving Average (ARIMA) Model and to identify the dominating ratios for measuring the efficiency of the TAICO Bank.

KEYWORDS
Bank, TAICO Bank, Small Scale Industries, Tamilnadu, Tukey Hamming Model.

INTRODUCTION

The Tamilnadu Industrial Cooperative Bank (TAICO Bank) started functioning from November, 1962. The main objective of the Tamilnadu Industrial Cooperative Bank is to provide a comprehensive range of financial assistance to the industrial cooperative societies working under the control of Director of Industries and Commerce and other cooperative societies with the prior permission of the Director of Industries and Commerce. It extends the banking services to the public on line with other cooperative banks.

The other objectives of this bank are to promote the growth of industries by financing industrial cooperatives and other cooperatives which the government or the Registrar may direct to be admitted as members and individuals, partnership firms, joint stock companies and so on engaged in small, tiny, cottage and village industries in the non farm sector. An attempt has been made in this paper to analyse the operational efficiency of the bank through various models.

OBJECTIVES OF THE STUDY

This research study is pursued with the following objectives:

1. To identify the significant factors influencing the net profit.
2. To know the transitional changes in the working of the bank
3. To evaluate the periodic changes in the functioning of the bank.
4. To measure the operational efficiency and time series changes in the working of the bank.
5. To analyse the dominating ratios for measuring the efficiency of the bank

REVIEW OF LITERATURE

The various studies relating to the operational and overall profitability performance are given as under:

S.Dasarathan[1] (1995) in his thesis, "A Study on the Operational Efficiency of Urban Cooperative Banks in Tiruchirapalli District" has analysed in detail the deposit mobilization, solvency, liquidity, profitability performance, loans and advances and overdues through ratio analysis.

Joy Joseph Puthussery[2] (1998) studied "The Determinants of Profit in Primary Agricultural and Rural Development Banks in Kerala". The main objectives of the study were to examine the factors affecting the profitability of the primary agricultural and rural development banks and to examine the relationship between profitability and overdues. The interest expense was growing at the rate of 16.01 per cent while the interest income was growing only at the rate of 14.76 per cent. The total expenses was growing at a higher rate of 15.82 per cent than that of the total income of 14.88 per cent. The analysis clearly identified that the cost components were increasing at a higher rate than the income factors. The overdues also had substantially increased. These two factors had contributed to the negative growth of profit of the banks.

Samwel Kakuku Lopoyetum[3] (2005) in his article elaborated that the profitability performance of the UCBs can be improved by strengthening the magnitude of burden ratio. The spread ratio can be increased by increasing the interest receipts faster than the interest payments. The burden ratio can be lowered by decreasing the manpower expenses, other expenses and increasing other incomes.

J.P. Singh, and S.K. Rawat[4] (1999) conducted a discriminate function analysis in the loans of cooperative banks with special reference to Hamirpur District of Uttar Pradesh and stated that a linear discriminate function was used to predict whether a crop loan defaulter was likely to be wilful or non wilful defaulter. The relative importance of various factors namely operational size of holding, limited amount of loan, income from agriculture, family consumption expenditure, in regard to their power to discriminate between the wilful and non wilful defaulters were known with the help of discriminate functions.

R.P. Gupta[5] (2003) in his article analysed the working of scheduled Urban Cooperative Banks in India and gave the following suggestions to improve their overall performances:

- to widen the activities of UCBs
- they should be given autonomy in deciding lending policy
- they should be allowed to increase the ceiling amount for the purchase of consumer durables from Rs.1 lakh to Rs.2 lakhs.
- for amalgamation or takeover of other weak cooperative banks, only permission from the RBI should be necessary and not from cooperative departments of the concerned state.

V.M. Selvaraj and Gayathri[6] (2004) studied overall performance of Thalapathisamuthiram Primary Agricultural Cooperative Bank. The main objectives of the study were to analyze the deposit mobilization, pattern of deposits and their growth, to study the lending policy of the bank and to analyse the financial

performance of the bank. They concluded that on the whole, the deposit mobilization and credit deployment of the bank have been satisfactory. The general financial position of the bank is also satisfactory.

METHODOLOGY

This study is based on secondary data. The data required for the study have been collected from the annual accounts of the TAICO Bank, books, journals and the like. Discussions have also been held with the officials of the bank. The overall analysis has been done through S.P.S.S. Package – Version 14.1.

PERIOD OF THE STUDY

This study covers a period of 11 years commencing from 1998-99 to 2008-09.

ANALYSIS OF THE STUDY

FACTORS INFLUENCING THE NET PROFIT

For assessing the influencing factors on the net profit of the TAICO Bank, Multiple Linear Regression Analysis has been used and ten variables have been identified. In order to avoid the problem of multi-colinearity among the ten coefficient factors, the factors namely interest income, non interest income, non interest expenditure and total expenditure were dropped, since these factors are included and form a factor in the other coefficient variables. Hence, the independent variables taken up for running the regression analysis are: net profit, interest paid, total deposits, total income, burden, spread and net working funds. Table 1 indicates the overall details of above mentioned variables for the study period.

TABLE 1: INDEPENDENT VARIABLES FOR REGRESSION ANALYSIS (Rs. in Lakhs)

Year	*Net Profit*	*Interest Paid*	*Total Deposits*	*Total Income*	*Spread*	*Burden*	*Working Capital*
1998-1999	- 157.27	329.91	3290.31	664.19	314.04	500.55	1566.76
1999-2000	- 273.32	420.44	4467.54	737.62	291.42	590.93	1786.55
2000-2001	104.45	456.51	508657	943.02	466.54	609.74	2176.75
2001-2002	150.89	642.67	7408.57	975.01	307.35	609.74	1682.75
2002-2003	215.19	905.75	12665.96	1598.16	641.23	1157.54	2636.28
2003-2004	205.55	1311.19	17964.78	2234.79	840.58	1570.04	6251.65
2004-2005	243.19	1566.76	22076.06	2707.42	1053.39	1899.86	6429.61
2005-2006	169.84	1683.31	23733.75	2691.51	922.84	2034.89	7768.53
2006-2007	45.35	1854.86	26239.86	3021.44	1076.18	2295.48	6756.80
2007-2008	78.10	2515.31	31363.34	3571.44	946.83	3002.03	9240.64
2008-2009	91.04	2871.74	35888.67	3981.95	995.00	3577.83	8359.69

Source: Annual Accounts of the TAICO Bank.

It is inferred from the Table 1 that all the independent variables taken for the regression analysis show an increasing trend for all the years under the study period except the two variables namely net profit and spread. The functional form of regression model is as follows:[7]

$Y = b_o + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6$

Where Y = Net Profit, x_1 = interest paid, x_2 = total deposits, x_3 = total income, x_4 = spread, x_5 = burden, x_6 = net working funds, b_o = intercept and b_1 to b_6 are regression coefficients. The analysis is made through S.P.S.S. Package – Version 14.1 and the results are given in Table 2.

TABLE 2: FACTORS INFLUENCING NET PROFIT – MULTIPLE REGRESSION ESTIMATES OF THE VARIABLES

Factors	*Coefficient*	*T*	*Significance*
(Constant)	- 0.020	- 1.314	0.280
Interest paid	- 0.001	- 1.332	0.275
Spread	0.998	1537.130	0.000
Burden	- 1.000	5532.100	0.000
Total Deposits	0.000	- 4.228	0.024
Total Income	0.001	1.157	0.331
Net Working Funds	0.000	12.428	0.001
R^2	1.000		
F	68671336		

Source: Computed Data from the Annual Accounts of TAICO Bank.

Table 2 exhibits the regression estimates of the influencing variables of net profit. Among the related six factors the coefficient of total deposits, spread burden and the net working funds show values which are less than 0.05 and hence are statistically significant. The coefficient of burden and spread are closely equal to 1 which shows that each unit increase in these factors will contribute a unit to net profit and hence the result is as per the expectation. The coefficient of the net working funds and that of total deposits are very negligible. The coefficient of the interest paid is negative. This negative influence of the interest paid is mainly due to two reasons. One is the level of short term deposits whose major portion is supposed to be idle. The second is the influence of fixed deposit on which the interest payable component is high. Only when this source is effectively utilized, it may contribute to high interest revenue and profits.

The growth in deposits had been higher than that of advances and hence the negative coefficient. However it is not found to be statistically significant. Even though the coefficients of total income and the interest paid are statistically not significant, the signs of the coefficient are upto the expectation in that the result shows a negative relationship between interest paid and net profit as well as a positive relationship between total income and the net profit. Thus it can be concluded that the factors such as total deposits, spread, burden, networking funds, interest paid and total income are the factors influencing the net profit of the TAICO Bank.

TRANSITIONAL CHANGES IN THE WORKING OF THE BANK – CLUSTER MODEL

K – Means cluster analysis is a technique which is used to know the transitional changes in the overall working of the TAICO Bank by considering the 47 ratios. The details regarding the 47 ratios are presented in Tables 3.

TABLE 3: RATIOS SELECTED FOR CLUSTER MODEL

Year	*Loans per Employee (Rs. in Lakhs)*	*Deposits per Employee Ratio (Rs.in Lakhs)*	*Business per Employee Ratio (Rs.in Lakhs)*	*Total Outside Liabilities to Net Worth (Times)*	*Deposits to Equity (Times)*	*Deposits to Total Assets (in %)*	*Net NPAs to Net Advances (in %)*	*Total Liabilities to Owned Funds* (Times)
1998-1999	21.21	24.37	684.49	2.96	2.36	59.47	30.10	3.97
1999-2000	28.27	28.27	692.63	2.65	2.60	61.16	31.36	4.18
2000-2001	36.34	36.34	751.47	3.30	2.51	53.81	25.73	3.19
2001-2002	48.54	48.54	937.02	4.45	4.10	68.89	15.81	5.95
2002-2003	83.14	83.14	1149.56	7.38	6.81	75.20	12.00	9.06
2003-2004	103.57	103.57	1883.91	9.76	8.96	75.75	10.40	11.78
2004-2005	134.05	134.05	2199.18	10.39	9.43	72.33	9.14	13.04
2005-2006	150.16	150.16	2217.12	10.05	9.02	80.90	8.99	11.15
2006-2007	182.98	182.98	2706.08	9.89	8.46	76.98	9.33	10.99
2007-2008	196.86	196.86	2918.77	10.38	9.33	81.59	6.10	11.43
2008-2009	224.53	224.53	3184.24	10.89	9.79	81.00	6.88	12.05

Source: Annual Accounts of TAICO Bank.

TABLE 4: RATIOS SELECTED FOR CLUSTER MODEL

Years	*Total Assets to Equity Fund (Times)*	*Liquid Assets to Total Deposits (in %)*	*Cash to Reserve (Times)*	*Staff Cost to Total Income (in %)*	*Cash to Volume of Business (in %)*	*Net NPAs to Total Advances (in %)*	*Total Income to Total Assets (in %)*	*Total Expenses to Total Income (in %)*
1998-1999	3.92	28.03	1.84	18.85	1.68	23.14	12.01	63.08
1999-2000	4.18	26.62	1.64	18.16	2.08	23.49	10.10	59.38
2000-2001	4.67	24.02	1.54	13.96	2.24	25.01	9.98	63.67
2001-2002	5.95	21.59	1.84	20.39	1.91	12.99	9.07	81.93
2002-2003	9.06	21.41	2.77	11.90	2.41	10.69	9.49	75.63
2003-2004	11.76	29.26	4.67	8.95	2.79	9.36	9.42	73.96
2004-2005	13.04	24.16	4.22	8.73	2.57	8.35	8.87	73.40
2005-2006	11.15	27.37	4.12	8.89	2.87	8.15	9.18	78.36
2006-2007	10.99	23.92	3.04	8.89	2.39	8.49	8.87	75.74
2007-2008	11.43	27.22	3.59	8.35	2.85	5.56	9.29	87.12
2008-2009	12.09	27.80	3.99	9.93	3.07	6.16	8.99	91.22

Source: Annual Accounts of TAICO Bank.

TABLE 5: RATIOS SELECTED FOR CLUSTER MODEL

Years	*Total Expenses to Total Assets (in %)*	*Current Assets to Volume of Business (in %)*	*Returns to Average Assets (in %)*	*Liquid Assets to Total Deposits (in%)*	*Liquid Assets to Total Deposits (Times)*	*Operating Expenses to Total Expenses (in %)*	*Fixed Deposits to Total Deposits (in %)*	*Net Profit to Owned Funds (in %)*
1998-1999	49.67	2.28	- 2.89	47.13	5.19	23.28	78.97	- 11.29
1999-2000	57.00	2.53	- 4.26	43.52	6.66	21.63	84.14	- 15.66
2000-2001	48.41	2.98	1.25	44.64	7.30	19.46	82.65	5.16
2001-2002	65.91	2.43	1.49	31.34	4.64	27.57	83.91	8.35
2002-2003	56.68	2.87	1.56	28.47	7.82	15.31	86.85	11.57
2003-2004	58.67	3.26	1.01	38.63	11.29	11.81	89.96	10.22
2004-2005	57.87	3.08	0.90	33.41	12.09	11.60	88.95	10.39
2005-2006	62.54	3.54	0.57	31.81	10.48	10.95	88.04	6.45
2006-2007	61.39	3.05	0.14	31.07	8.80	10.92	86.19	1.46
2007-2008	70.43	3.23	0.22	33.36	7.65	9.32	84.99	2.32
2008-2009	72.11	3.12	0.22	34.32	6.68	9.78	86.44	2.49

Source: Annual Accounts of TAICO Bank.

TABLE 6: RATIOS SELECTED FOR CLUSTER MODEL

Years	*Net Profit to Total Deposits (in %)*	*Net Profit to Total Income (in %)*	*Net Profit to Working Capital (in %)*	*Net Profit to Total Assets (in %)*	*Net Profit to Total Spread (in %)*	*Spread to Total Income (in %)*	*Current Ratio (Times)*	*Total Income to Working Capital (in %)*
1998-1999	- 4.78	- 23.68	- 10.03	- 2.84	- 50.08	47.28	3.90	42.39
1999-2000	- 6.12	- 37.05	- 15.30	- 3.74	- 03.79	39.51	4.10	41.29
2000-2001	2.05	11.08	4.80	1.10	22.39	49.47	3.59	43.32
2001-2002	2.04	15.48	8.97	1.40	49.09	31.52	2.31	57.94
2002-2003	1.70	13.46	8.16	1.28	33.56	40.12	2.59	60.62
2003-2004	1.14	9.20	3.29	0.87	24.45	37.61	4.61	35.75
2004-2005	1.10	8.98	3.78	0.80	23.09	38.91	3.80	42.11
2005-2006	0.72	6.31	2.19	0.58	18.40	34.29	4.67	34.65
2006-2007	0.17	1.50	0.67	0.13	4.21	35.62	2.85	44.72
2007-2008	0.25	2.19	0.85	0.20	8.25	26.51	4.48	38.65
2008-2009	0.25	2.29	1.09	0.21	9.15	24.99	3.02	47.63

Source: Annual Accounts of TAICO Bank.

TABLE 7: RATIOS SELECTED FOR CLUSTER MODEL

Years	*Total Expenses to Working Capital (in %)*	*Burden to Working Capital (in %)*	*Cash to Current Liabilities (Times)*	*Working Capital to Volume of Business (in %)*	*Current Assets to Total Assets (in %)*	*Non Interest Income to Total Income (in %)*	*Interest Income to Total Income (in %)*	*Net Profit to Total Assets (in %)*
1998-1999	33.24	31.95	2.87	1.70	38.09	3.05	96.95	25.17
1999-2000	34.52	33.08	3.37	1.91	32.35	3.49	96.51	23.90
2000-2001	30.23	28.01	2.70	2.15	31.93	2.12	97.88	21.42
2001-2002	57.88	56.40	1.81	1.38	27.56	2.56	97.44	16.80
2002-2003	45.85	43.91	2.18	1.76	25.48	3.20	96.80	11.04
2003-2004	26.44	25.11	3.94	2.55	33.67	3.71	96.29	8.48
2004-2005	30.91	29.55	3.17	2.27	28.58	3.22	96.78	7.67
2005-2006	27.29	26.19	3.79	2.78	33.69	3.17	96.83	8.97
2006-2007	35.31	33.97	2.23	1.98	30.54	3.00	97.00	9.10
2007-2008	33.67	32.49	3.94	2.51	30.95	3.06	96.94	8.75
2008-2009	44.18	42.80	2.98	2.08	28.21	2.91	97.09	8.27

Source: Annual Accounts of TAICO Bank.

TABLE 8: RATIOS SELECTED FOR CLUSTER MODEL

Years	*Net Capital Ratio (in %)*	*Fixed Assets to Owned Funds (in %)*	*Current Assets to Net Worth (Times)*	*Spread to Total Assets(in %)*	*Cash to CA (in %)*	*Demand Liabilities to Total Liabilities (in %)*	*Credit Deposit Ratio(%)*
1998-1999	95.67	10.24	9.76	5.68	73.58	5.40	87
1999-2000	106.14	8.61	11.62	3.99	82.28	4.00	85
2000-2001	103.70	7.48	13.37	4.94	75.21	3.29	96
2001-2002	106.40	8.57	11.67	2.86	78.35	4.65	85
2002-2003	104.92	8.38	11.94	3.81	84.02	2.74	85
2003-2004	108.72	8.18	12.23	3.54	85.52	2.59	75
2004-2005	114.50	7.56	13.23	3.45	83.40	2.00	78
2005-2006	100.88	6.96	14.36	3.15	81.19	2.61	80
2006-2007	100.89	5.86	17.06	3.16	78.31	2.72	88
2007-2008	100.48	9.14	10.94	2.46	87.97	3.56	79
2008-2009	100.31	17.19	5.82	2.25	98.54	4.18	79

Source: Annual Accounts of TAICO Bank.

For identifying the periodic changes in the overall functioning of the TAICO Bank, the interrelationship between the ratios become indispensable to rank the ratios suitable for the financial performance of the TAICO Bank. In this juncture a year-wise breakup for the financial performance is required for the ratios to identify the turning points or crisis in the span of 11 years. This helps the researcher to identify the transitional implications in TAICO Bank and this Cluster Analysis is brought back on the problem of the segmenting the transitional changes in 11 years. It is a technique used to know the transitional changes that have taken place in the overall functioning of the bank. The number of cases in each cluster are indicated in Table 9.

TABLE 9: IDENTIFICATION OF CHANGES IN PERFORMANCE – NUMBER OF YEARS IN EACH CLUSTER

Cluster 1 (1998-99 to 2002-03) – Five Years	5.000
Cluster 2 (2003-2004 to 2008-09) – Six Years	6.000
Validity	11.000
Missing	.000

From the Table 9, it is inferred that the 47 financial ratios are broadly classified into two groups, where they have made significant changes. It is found from the frequency distribution, in TAICO Bank, the conspicuous changes are found in two different stages namely 1999 to 2003 (1998-99 to 2002-2003) and 2004-2009 (2003-04 to 2008-09). This shows that the financial performance of TAICO Bank is consistent for the first 5 years (1999 to 2006) and a drastic change is realized in the overall functioning of the bank during the last six years from 2004 to 2009. Table 10 shows the grouping of 47 ratios under two clusters and its values.

TABLE 10: GROUPING OF RATIOS AND CLUSTER VALUES

Ratios	*Clusters*		*Ratios*	*Cluster*	
	1	*2*		*1*	*2*
TL to OF	5.27	11.74	TE to TI	56.13	63.84
FA to OF	8.66	9.15	TI to WC	49.11	40.58
CA to CL	3.30	3.90	TE to WC	40.34	32.97
NP to TA	-0.56	0.46	LA to TD	39.02	33.77
NP to OF	-0.37	5.56	NW to FA	1167.30	1227.26
TOL to NW	4.15	10.26	SPR to TA	4.26	6.37
TA to TD	87.89	79.82	DE to EQU	3.68	9.17
TA toTL	1.03	1.04	DE to TA	3.68	8.88
WC to VOB	1.78	2.36	II to TI	97.12	96.82
CA to VOB	2.62	3.21	IE to TI	55.53	63.84
CA to TA	31.08	30.94	SC to TI	16.65	8.96
CASH to CA	78.69	85.82	FD to TD	83.30	87.43
CASH to CL	258.61	334.22	Net NPAs to TA	25.64	13.48
CASH to VOB	2.06	2.76	TA to EQ	5.56	11.74
NP to TI	-4.14	5.08	NP to TI	-1.96	5.16
NP to SPR	-7.77	14.59	TI to TA	11.92	9.13
NP to WC	-0.68	1.98	NW to TA	2.88	3.18
BUS - EMP	843.03	2518.22	NII to TI	2.88	3.18
DEP - EMP	49.91	206.61	LA to DD	39.02	33.77
TLA - EMP	43.50	165.36	BUR to WC	38.67	31.69
LA to TA	6.32	25.89	OE to TE	21.45	12.54
DL to TL	4.02	2.94	Net NPAs to NA	23.00	8.47
CASH to RES	54.31	25.89			

From the above Table 10, it is found that thirty two ratios showed an increasing trend in the span of 11 years and fifteen ratios showed a decreasing trend in these years. That is, in the two blocks of years, an increase in the numeric values is found significantly for 32 ratios and a decrease in the numeric values is found significantly for 15 ratios during the study period.

On the whole, out of 47 ratios, two thirds (67%) of the ratios increased rapidly and one third (33%) of the ratios decreased rapidly This implies that the financial performance of TAICO Bank has been increased for the past 11 years significantly and it has increased its liabilities, fixed assets and profitability position to a greater extent. At the same time, a decrease in expenditures, net profit and current assets is seen. This strategy is a peculiar financial strategy to safeguard the bank from the grips of NPAs.

PERIODIC CHANGES IN THE WORKING OF THE BANK – TUKEY - HAMMING MODEL

Tukey- Hamming Model is a statistical device used to analyse the periodic changes in the overall working of the TAICO Bank. The variables pertaining to net operating profit, operating expenses, capital employed, interest expenses and gross income has been analysed in this model and are presented in Table 11.

TABLE 11: SELECTED VARIABLES FOR TUKEY-HAMMING MODEL (Rs. in Lakhs)

Year	*Net Operating Profit*	*Operating Expenses*	*Capital Employed*	*Interest Expenses*	*Gross Income*
1998-1999	- 157.27	121.74	1392.72	329.91	664.19
1999-2000	- 273.32	129.85	1745.77	420.44	737.62
2000-2001	104.45	128.07	2024.48	456.51	943.02
2001-2002	150.89	268.53	1806.67	642.67	975.01
2002-2003	215.19	185.06	1859.14	905.75	1598.16
2003-2004	205.55	195.23	2010.40	1311.19	2234.79
2004-2005	243.19	230.51	2340.00	1566.76	2707.42
2005-2006	169.84	232.17	2631.47	1683.31	2691.51
2006-2007	45.35	260.54	3101.21	1854.86	3021.44
2007-2008	78.10	289.98	3362.64	2515.31	3571.44
2008-2009	91.04	361.24	3664.20	2871.74	3981.95

Source: Annual Accounts of the TAICO Bank.

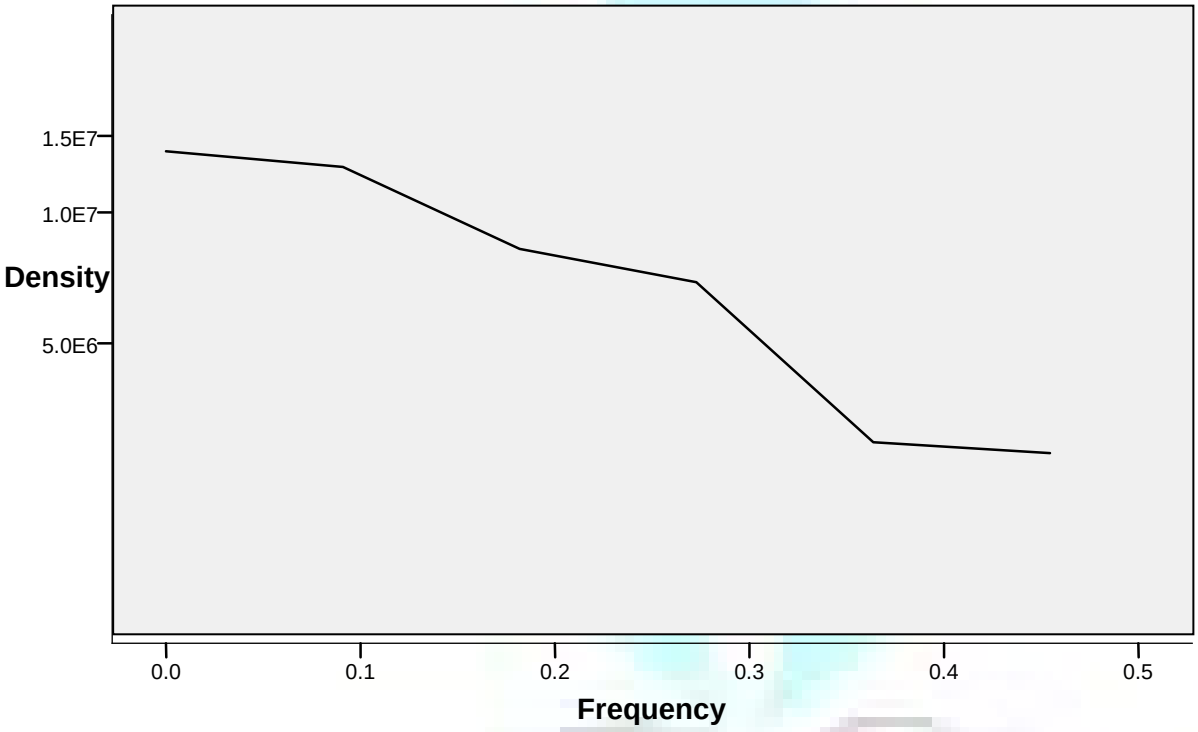
Table 11 shows that the three selected variables namely capital employed, interest expenses and gross income show an increasing trend and the remaining two variables namely net operating profit and operating expenses show a decreasing trend during the period of analysis.

The spectral density is useful to analyse the periodic changes in the above mentioned variables. It constructs suitable Sin and Cosin transform functions, periodogram value and spectral density estimates for each variable in every year. This would enable to identify strong seasonal components and the presence of longer cycles in the data. The analysis is done through S.P.S.S. Package – Version 14.1 and the results are presented in the model description Table 12 and Figure 1.

TABLE 12: PERIODIC CHANGES IN THE SELECTED VARIABLES–MODEL DESCRIPTION

Particulars			*Tukey –Hamming Values*
Model Name			MOD_1
Analysis Type			Univariate
Series Name	1. Operating Profit		VAR00002
	2. Operating Expenses		VAR00003
	3. Capital Employed		VAR00004
	4. Interest Expenses		VAR00005
	5. Gross Income		VAR00006
Range of Values			Reduced by Centering at Zero
Periodogram Smoothing	Spectral Window		Tukey-Hamming
	Window Span		5
	Weight Value		
	1. Operating Profit	W(-2)	1.344
	2. Operating Expenses	W(-1)	1.975
	3. Capital Employed	W(0)	2.240
	4. Interest Expenses	W(1)	1.975
	5. Gross Income	W(2)	1.344

Figure 1
Spectral Density of VAR00004 by Frequency



From the Table 12, it is found that Tukey – Hamming values are all greater than one, which implies that there is statistical significance at 5 per cent level. Thus it is inferred that operating profit, operating expenses, capital employed, interest expenses and gross income are showing an increasing trend, especially the capital employed and gross income presented its data with longer cycles rather than the other variables. It is followed by two subsequent variables namely operating expenses and interest expenses. The spectral density values clearly indicated an increasing and positive trends for a span of 11 years from 1998-99 to 2008-09. Therefore, it can be concluded that in TAICO Bank, the capital employed depends upon its operating expenses and interest expenses. They have more proximity with capital employed. It is also found through spectoral analysis that the operating profit in TAICO Bank constantly maintain a proportionality with gross income for the 11 years.

OVERALL EFFICIENCY AND TIMES SERIES CHANGES – ARIMA MODEL

The ARIMA Model is useful in identifying the Time Series changes and to estimate the forecasts about the overall functioning of the bank.[8] It automatically identifies and estimates the best fitting Arima or exponential smoothing model for one or more dependent variable series. In this present research work, the researcher identified a number of 47 independent variables as quoted in the cluster model against the five dependent variables(operating profit, operating expenses, capital employed, interest expenses and gross income). The details of the five dependent variables are depicted in Table 13.

TABLE 13: SELECTED VARIABLES FOR ARIMA MODEL (Rs. in Lakhs)

Year	*Net Operating Profit*	*Operating Expenses*	*Capital Employed*	*Interest Expenses*	*Gross Income*
1998-1999	- 157.27	121.74	1392.72	329.91	664.19
1999-2000	- 273.32	129.85	1745.77	420.44	737.62
2000-2001	104.45	128.07	2024.48	456.51	943.02
2001-2002	150.89	268.53	1806.67	642.67	975.01
2002-2003	215.19	185.06	1859.14	905.75	1598.16
2003-2004	205.55	195.23	2010.40	1311.19	2234.79
2004-2005	243.19	230.51	2340.00	1566.76	2707.42
2005-2006	169.84	232.17	2631.47	1683.31	2691.51
2006-2007	45.35	260.54	3101.21	1854.86	3021.44
2007-2008	78.10	289.98	3362.64	2515.31	3571.44
2008-2009	91.04	361.24	3664.20	2871.74	3981.95

Source: Annual Accounts of the TAICO Bank.

Table 13 shows that the three selected variables namely capital employed, interest expenses and gross income show an increasing trend and the remaining two variables namely net operating profit and operating expenses show a decreasing trend during the period of analysis.

The ARIMA Model is executed in this context and the following result is obtained and is presented in Table 14.

TABLE 14: PROJECTION OF VITAL RATIOS - ARIMA MODEL VALUES

Fit Statistic	Mean	SE	Minimum	Maximum	Percentile						
Particulars	5	10	25	50	75	90	95	5	10	25	50
Stationary R-squared	.786	.353	.156	.968	.156	.156	.528	.951	.961	.968	.968
R-squared	.786	.353	.156	.968	.156	.156	.528	.951	.961	.968	.968
RMSE	214.067	32.839	172.294	247.293	172.294	172.294	183.366	209.686	246.959	247.293	247.293
MAPE	18.016	8.588	9.544	31.503	9.544	9.544	10.738	17.177	25.713	31.503	31.503
MaxAPE	61.015	33.477	17.293	97.786	17.293	17.293	26.981	68.401	91.357	97.786	97.786
MAE	168.895	33.118	124.599	207.752	124.599	124.599	138.922	164.473	201.078	207.752	207.752
MaxAE	332.251	57.986	280.190	421.543	280.190	280.190	281.106	329.834	384.603	421.543	421.543
Normalized BIC	11.149	.312	10.734	11.457	10.734	10.734	10.855	11.127	11.454	11.457	11.457

Source: Box, Jenkins and Reinsel, "An Over view of Multiple Regression Co-efficient", **American Journal of Sunsehes**, 1994, pp.141-170.

It gives out Stationery R^2 Values, Varying R^2 values, Root mean Square Error (RMSE), MEAN Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), Maximum Absolute Error (MAE), Maximum absolute Percentage Error (MAPE), Normalised Bayesian Information. The modified ARIMA values are presented in Table 15.

TABLE 15: PROJECTION OF VITAL RATIOS - MODIFIED ARIMA MODEL VALUES

Fit Statistic	Mean	SE	Minimum	Maximum	Percentile						
Particulars	5	10	25	50	75	90	95	5	10	25	50
Stationary R-squared	.375	.414	-4.44E-016	.814	-4.44E-016	-4.44E-016	-1.11E-016	.333	.782	.814	.814
R-squared	.923	.035	.857	.956	.857	.857	.905	.931	.945	.956	.956
RMSE	6005.887	11668.442	341.950	29768.821	341.950	341.950	797.316	1122.609	9489.878	29768.821	29768.821
MAPE	17.697	6.733	11.780	29.019	11.780	11.780	12.844	14.761	24.253	29.019	29.019
MaxAPE	54.167	28.293	28.838	95.421	28.838	28.838	31.098	42.908	86.163	95.421	95.421
MAE	4353.603	8261.369	231.653	21157.208	231.653	231.653	584.499	867.894	7010.442	21157.208	21157.208
MaxAE	12691.656	25466.909	760.706	64584.272	760.706	760.706	1156.415	2226.779	19943.378	64584.272	64584.272
Normalized BIC	15.319	2.979	12.130	20.833	12.130	12.130	13.634	14.381	17.249	20.833	20.833

Source: Box, Jenkins and Reinsel, "An Over view of Multiple Regression Co-efficient", **American Journal of Sunsehes**, 1994, pp.141-170.

From Table 15, it is found that the Mean, Standard Error with maximum and minimum fit statistics are sharply estimated. Since the whole series is centered at mean values, it can be concluded that collectively the five variables totally exhibit 78.6 per cent variance in the past 11 years. The RMSE variance and NAPE variance are respectively 214.067 and 18.016 with normalized BIC variance 11.149. This implies that the five variables have made significant changes, that is 11.14 per cent each year on the average.

Thus it can be concluded that the variation is above 50 per cent in the span of 11 years for TAICO Bank. It shows that the TAICO Bank has performed financially well with respective increase in its operating profit and gross income. At the same time the increase in operative expenses and interest expenses, capital employed shows its significant financial development.

MEASUREMENT OF EFFICIENCY (DOMINATING RATIOS) - BOX'S M AND WILKS' LAMBDA MODEL

In this present research work, the researcher has identified a number of 47 independent ratios as quoted in the cluster analysis.

Further microscopic analysis is required to point out the predominant ratios affecting the financial performance and these predominant financial ratios need to be performed well to determine the financial performance of TAICO Bank.

Box's M and Wilks' Lambda Test are subsequently applied to point out the steps to extract predominant ratios. Table 17 shows the steps involved in Box's M and Wilks' Lambda Model.

TABLE 16: DOMINATING RATIOS - STEPS INVOLVED IN BOX'S M AND WILKS' LAMBDA MODEL

Step	*Entered*	*Wilks' Lambda*							
		Statistic	*df1*	*df2*	*Df3*	*Extract F*			
						Statistic	*Df1*	*Df2*	*df3*
1.	TL to NW	.137	1	1	9.000	56.906	1	9.000	.000
2.	TI to WC	.033	2	1	9.000	118.253	2	8.000	.000
3.	CA to CL	.011	3	9	9.000	217.834	3	7.000	.000
4.	WC to VB	.004	4	1	9.000	370.180	4	6.000	.000
5.	CA to TA	.001	5	1	9.000	1.258E3	5	5.000	.000

At each step, the variable that minimises the overall Wilks' Lambda is entered.

a. Maximum Number of steps is 94
b. Minimum partial F to enter is 3.84
c. Maximum partial F to remove is 2.71
d. F level, tolerance or VIN insufficient for further computation.

From the Wilks' Lambda Test, it is found that the five steps, predicted five ratios namely total liabilities to net worth, total income to working capital, current assets to current liabilities ratio (current ratio), working capital to volume of business and current assets to total assets. Table 17 shows significant ratios for measuring the financial performance of the bank.

TABLE 17: SIGNIFICANT RATIOS FOR MEASURING FINANCIAL PERFORMANCE OF THE TAICO BANK

Years	*Total Liabilities to Owned Funds* (Times)	*Total Income to Working Capital(in %)*	*Current Ratio (Times)*	*Working Capital to Volume of Business (in %)*	*Current Assets to Total Assets (in %)*
1998-1999	3.97	42.39	3.90	1.70	38.09
1999-2000	4.18	41.29	4.10	1.91	32.35
2000-2001	3.19	43.32	3.59	2.15	31.93
2001-2002	5.95	57.94	2.31	1.38	27.56
2002-2003	9.06	60.62	2.59	1.76	25.48
2003-2004	11.78	35.75	4.61	2.55	33.67
2004-2005	13.04	42.11	3.80	2.27	28.58
2005-2006	11.15	34.65	4.67	2.78	33.69
2006-2007	10.99	44.72	2.85	1.98	30.54
2007-2008	11.43	38.65	4.48	2.51	30.95
2008-2009	12.05	47.63	3.02	2.08	28.21

The Wilks' Lambda test is achieved through five steps. In the first step, total liabilities to net worth is predicted in all the steps,[9] followed by total income to working capital in four steps, current ratio in three steps, working capital to volume of business in two steps and current assets to total assets in only one step. At the fifth step, all the five ratios are obtained. The F value and Lambda values are 56.906, 118.253, 217.834, 370.180, 1.258 E 3 (1.258×10^3). They are statistically significant at 5 per cent level. Their standardized canonical discriminant coefficient are also found significantly in the following Tables 18 and 19.

TABLE 18: STANDARDIZED CANONICAL DISCRIMINANT COEFFICIENT VALUES FOR THE DOMINATING RATIOS

Step		*Tolerance*	*F to Remove*	*Wilks' Lambda*
1.	TL to NW	1.000	56.906	
2.	TL to NW	.318	165.202	.708
	TI to WC	.318	25.389	.137
3.	TL to NW	.116	384.586	.593
	TI to WC	.024	42.673	.075
	CA to CL	.047	14.611	.033
4.	TL to NW	.034	416.797	.284
	TI to WC	.009	103.764	.074
	CA to CL	.036	13.142	.013
	WC to VB	.108	9.756	.011
5.	TL to NW	.007	1456.741	.232
	TI to WC	.001	354.751	.057
	CA to CL	.010	51.005	.009
	WC to VB	.019	59.025	.010
	CA to TA	.039	20.400	.004

Source: R.E. Frank, W.E. Massey and D.G.Morrison, "Bias in Multiple Discriminant Analysis", **Journal of Marketing Research**, Vol.2 No.3, 1995, pp.250-258.

TABLE 19: STANDARDIZED CANONICAL DISCRIMINANT COEFFICIENT VALUES FOR THE DOMINATING RATIOS

Ratios	*Function*
	1
CA to CL	-0.454
TL to NW	-11.640
WC to VB	7.000
CA to TA	4.562
TI to WC	27.358

Source: R.E. Frank, W.E. Massey and D.G.Morrison, "Bias in Multiple Discriminant Analysis", **Journal of Marketing Research**, Vol.2 No.3, 1995, pp.250-258.

From the above Tables 18 and 19, it is inferred that among these five groups, the following order is vital in determining the financial performance. In a span of 11 years it is concluded that the above mentioned five ratios are considered as important financial ratios affecting the financial performance of TAICO Bank. They concentrate more on current assets, total liabilities; working capital required for management and also gave more importance to volume of business. Total income is found indispensable and it is further shared with working capital. Thus the above mentioned five ratios namely, total liabilities to networth, total income to working capital, current ratio, working capital to volume of business and current assets to total assets are considered as the important ratios to measure the overall financial performance of the TAICO Bank.

CONCLUSION

The bank has been really rendering tremendous services by providing various types of loans to the industrial cooperatives, small scale industries and the like in Tamilnadu. It is advisable for the bank to take effective steps to maintain the increasing and growing trends in the overall functioning the bank in the future years.

REFERENCES

1. S. Dasarathan, "A Study on the Operational Efficiency of Urban Cooperative Banks in Tiruchirapalli District" Unpublished Ph.D. Thesis Submitted to Bharathidasan University, Tiruchirapalli 1995.
2. Joy Joseph Puthussery, **"Determinants of Profit in Primary Agricultural and Rural Development Banks in Kerala",** Vol.36, No.1, 1998, pp.3-8.

3. Samwel Kakuko Lopoyetum, "A Study of Business Performance with Special Reference to Profitability and Viability Dimension – Uthamapalyam Urban Cooperative Bank, Theni District," **Cooperative Perspective**, Vol.37, No.4, March 2005, pp. 61-81.
4. J.P. Singh, and S.K. Rawat, "Discriminant Function Analysis in the Loans of Cooperatives with Special Reference to Hamirpur District of Uttar Pradesh" **Indian Cooperative Review,** Vol.37, No.2, 1999, pp.69-73.
5. R.P. Gupta, "An Appraisal of the Working of Scheduled Urban Cooperative Banking in India", **The Cooperative,** Vol.40, No.8, February 2003, pp.346-349.
6. V.M.Selvaraj and M.Gayathri, "Thalapathisamuthiram Primary Agricultural Cooperative Bank – Overall Performance", National Cooperative Union of India **Indian Cooperative Review,** Vol.14, No.3, January 2004, pp.199- 213.
7. S.P. Gupta, **Statistical Methods**, Sultan Chand and Sons, New Delhi, 2004.
8. Box, Jenkins and Reinsel, "An Overview of Multiple Regression Co-efficient", **American Journal of Sunsehes**, 1994, pp.141-170.
9. R.E. Frank, W.E. Massey and D.G.Morrison, "Bias in Multiple Discriminant Analysis", **Journal of Marketing Research**, Vol.2 No.3, 1995, pp.250-258.

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