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DISCRIMINANT ANALYSIS FOR BRANCH PROFITABILITY

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ABSTRACT

Performance of a Bank Branch can be measured by a number of indicators. Profitability is the most important and reliable indicator as it gives a broad indication of the capability of a Bank to increase its earnings. Profitability assumes greater importance in the changing scenario. The objective of this analysis is to develop a Discriminant function for Branch Profitability using the most significant ratios. This analysis attempts to identify the most critical ratios using a multivariate analysis technique called Discriminant Analysis. The sample consists of 326 bank branches in Tamil Nadu. The technique used for developing the Discriminant function of Branch Profitability is Step wise Discriminant Analysis.

Deposit per branch is the most discriminating factor. Business per branch is the second most discriminating factor. NPA to total advances and priority sector advances to total advances are the third and fourth most discriminating factors between the two cluster groups. Discriminant Analysis identified only four variables among the thirteen variables as the significant discriminators of branch profitability (Profit per branch being the dependent variable). All the four variables have already been the most acknowledged variables influencing profitability of branches and the discriminant function confirms the same.

The Discriminant model developed and the reduced set of four key variables provide an empirically tested frame work for financial decision making in Bank Branches in Tamil Nadu.

The overall performance of the bank depends on the performance of the branches. Hence necessary steps should be taken to improve the working conditions and working of the branches in a more effective way.

KEYWORDS: *Branch Performance, Branch Profitability, Discriminant Analysis, Significant Ratios.*

INTRODUCTION

A bank organizes itself into various business units called branches for attaining its corporate objectives. Branches being the important organs of the body corporate of a bank, their performance should be judged on the basis of whether they are contributing to the attainment of various corporate objectives. This can be done by having a properly drawn business plan specifying the corporate objectives and realistic performance budgets for branches, which should be drawn up after taking into account the environmental conditions, special factors if any and the past trends.

Each branch will contribute its best to the achievement of the banks' policy / goals which include commercial viability and social objectives. Rural branches will contribute substantially towards attaining the objective of increasing priority sector advances in general and agricultural advances in particular. Branches in metropolitan areas, particularly those in residential localities would contribute immensely to the resources pool, while those in busy business localities would take care of commercial viability. Thus all the branches put together would help the bank to achieve its goals. Hence branch is an important base of the bank organization.

SIGNIFICANCE AND NEED OF THE STUDY

Performance of a Bank Branch can be measured by a number of indicators. Profitability is the most important and reliable indicator as it gives a broad indication of the capability of a Bank to increase its earnings. Profitability assumes greater importance in the changing scenario of autonomy and financial sector reforms. The viability of branches depends largely on the adequacy of profits and profitability.

OBJECTIVES OF THE STUDY

The objective of this analysis is to develop a Discriminant function for Branch Profitability using the most significant ratios.

METHODOLOGY

This analysis attempts to identify the most critical ratios using a multivariate analysis technique called Discriminant Analysis. The sample consists of 326 bank branches in Tamil Nadu.

ANALYSIS

Discriminant Analysis involves deriving the linear combination of two or more independent variables that will discriminate between the a-priori defined groups. Profit per branch is the dependant variable. The mean profit is Rs 290.76 (in lakhs). Branches that showed

profits greater than the mean profit have been a-priori assigned into high profitable group (with categorical value of 1) and those earning profits less than the mean profit are grouped as low profitable branches (with categorical value 0).

The group wise distribution of branches is presented in Table 1

TABLE 1
BANK BRANCHES IN TAMIL NADU AND THEIR PROFITABILITY
CLASSIFICATION

Categorical value	No. of Branches
0	235
1	91
Total	326

The 13 independent variables or ratios are as follows

Variable	Name of the ratio
X1	Deposit per employee(depee)
X2	Credit per employee (cree)
X3	Business per employee (bnsee)
X4	Term deposits to non term deposits (termnon)
X5	Term deposits to total deposits (termtot)
X6	Non term deposits to total deposits (nontot)
X7	Deposit Credit ratio (depcrrat)
X8	Priority sector advances to total advances(pstadv)

X9	Credit Deposit ratio (cdratio)
X10	NPA to total advances (npatadv)
X11	Deposit per branch (depbr)
X12	Advances per branch (advbr)
X13	Business per branch (bnsbr)

Discriminant analysis is carried out using SPSS software package. The technique used for developing the Discriminant function of Branch Profitability is Step wise Discriminant Analysis. Discriminant analysis has the objectives of determining linear combinations of predictor variables to separate the groups, testing whether significant differences exist between the groups, and identifying the variables that count most in explaining the inter-group differences. The study uses Wilk's Lambda required for entry as 3.84 and maximum value for removal of independent variables as 2.71. At each step, the variable that minimizes the overall Wilk's Lambda is entered. The computation ends when any further entry of variables failed to minimize the Wilk's Lambda.

The process involves five steps with the final Wilk's Lambda of 0.702. The first step featured the selection X11 (Deposit per branch), followed by X13 (Business per branch) in the next step. In the third step X10 (NPA to total advances) is entered. In the fourth step X8 (Priority sector advances to Total advances) is entered. After step four, no other variable was found to have the tolerance level / F value more than the minimum value and hence the process was stopped. Table No 2 shows the variables entered

TABLE NO 2
VARIABLES ENTERED

Variables Entered/Removed^{a,b,c,d}

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	depbr	.736	1	1	323.000	115.648	1	323.000	.000
2	bnsbr	.720	2	1	323.000	62.546	2	322.000	.000
3	npatadv	.702	3	1	323.000	45.439	3	321.000	.000
4	pstadv	.693	4	1	323.000	35.446	4	320.000	.000

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

- Maximum number of steps is 26.
- Minimum partial F to enter is 3.84.
- Maximum partial F to remove is 2.71.
- F level, tolerance, or VIN insufficient for further computation.

Table No 3 shows the variables used in the analysis.

TABLE NO 3

Variables in the Analysis

Step		Tolerance	F to Remove	Wilks' Lambda
1	depbr	1.000	115.648	
2	depbr	.488	21.287	.768
	bnsbr	.488	7.218	.736
3	depbr	.486	18.658	.743
	bnsbr	.468	10.245	.724
	npatadv	.945	8.364	.720
4	depbr	.468	14.222	.724
	bnsbr	.430	13.281	.722
	npatadv	.928	6.582	.707
	pstadv	.886	4.136	.702

Table No 4 shows the Eigen value of the Canonical Discriminant Function.

TABLE NO 4

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.443 ^a	100.0	100.0	.554

- a. First 1 canonical discriminant functions were used in the analysis.

Table reveals that one canonical discriminant dimension (function) has been identified accounting for 100% of variance. The canonical dimension with canonical correlation of 0.554 and Eigen value of 0.443 explains 100% of variance.

Table No 5 shows the value of Wilk's Lambda

TABLE NO 5

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.693	117.736	4	.000

Table shows the Wilk's Lambda of 0.693 with significance of 0.000.

Table No 6 shows the standardized canonical discriminant function co-efficients.

TABLE NO 6 STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

Function	1
	.217
	.266
	.544
	.549

Table No.7 shows the structure matrix

TABLE NO.7

Structure Matrix

	Function
	1
depbr	.899
bnsbr	.826
advbr ^a	.495
bnsee ^a	.399
cree ^a	.381
depccrat ^a	.350
depee ^a	.307
npatadv	.122
pstadv	.113
termtot ^a	.075
nontot ^a	-.075
cdratio ^a	-.059
termnon ^a	.017

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

a. This variable not used in the analysis.

Tables 6 and 7 reveals that deposit per branch is the most discriminating factor. Business per branch is the second most discriminating factor. NPA to total advances and priority sector advances to total advances are the third and fourth most discriminating factors between the two cluster groups.

Table No.8 shows the classification results.

TABLE NO.8**Classification Results ^a**

			Predicted Group Membership		Total
			<mean profit=29 0.7644	>mean pfofit=29 0.7644	
Original	Count	<mean profit=290.7644	206	29	235
		>mean pfofit=290.7644	33	58	91
	%	<mean profit=290.7644	87.7	12.3	100.0
		>mean pfofit=290.7644	36.3	63.7	100.0

a. 81.0% of original grouped cases correctly classified.

Table 8 shows that 81% of the originally grouped cases have been correctly classified indicating reliability of clustering.

Thus Discriminant Analysis identified only four variables i.e., X12, X13, X10 and X8 among the thirteen variables as the significant discriminators of branch profitability. (Profit per branch being the dependent variable). The relative importance of these four independent variables, in terms of the standardized canonical co-efficient and discriminant loadings are given in Table No 9

TABLE 9

Results of the discriminant Analysis of Profitability of Bank Branches in Tamil Nadu

Variables	Standardized weights	Discriminant Loadings
X8 - Priority sector advances / total advances	0.217	0.113
X10 – NPA / total advances	0.266	0.122
X11 - Deposits per branch	0.544	0.899
X13 - Business per branch	0.549	0.826

The discriminant function arrived at is;

$$Z = 0.217 X_8 + 0.266 X_{10} + 0.544 X_{11} + 0.549 X_{13}$$

All the four variables are in the standardized form. The canonical correlation of the discriminant function is 0.554, which indicates a fairly strong relationship between the groups and the discriminant function. The centroids of the two groups are given in Table No 10

TABLE NO 10

Functions at Group Centroids

	Function
profit groups	1
<mean profit=290.7644	-.411
>mean pfofit=290.7644	1.072

Unstandardized canonical discriminant functions evaluated at group means

The centroids of the two groups are -0.411 for group 0 and 1.072 for group 1. The cut-off Z score is determined as $235 (-0.411) + 91 (1.072) / 326$ which is 0.97.

All the four variables have already been the most acknowledged variables influencing profitability of branches and the discriminant function confirms the same.

LIMITATIONS

The major limitation of this analysis is that both the samples selected (326 bank branches selected in Tamil Nadu) and the variables (13 independent variables) are not exhaustive in themselves, but they are definitely representative of the population (of all bank branches in Tamil Nadu) and the variables are to a good extent, the major determinants (Ratios) influencing the branch operations. The other limitations relates to that of the technique (Multiple Discriminant Analysis) and financial ratios per se. The analysis pertains to the total of three years data and any general conclusion has to be a qualified one. In spite of the above short comings it paves the path for future research on measuring branch profitability.

SUGGESTIONS

1. The branches should deploy the funds more effectively
2. They should increase the current and savings deposits of the bank
3. Increase in low cost deposits will in turn reduce the interest expenditure paid on deposits, thereby increasing the profits.
4. They should take necessary steps to give loans for productive purposes and try to increase the CD ratio.

CONCLUSION

The Discriminant model developed and the reduced set of four key variables provide an empirically tested frame work for financial decision making in Bank Branches in Tamil Nadu.

The overall performance of the bank depends on the performance of the branches. Hence necessary steps should be taken to improve the working conditions and working of the branches in a more effective way.

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