Chapter - III

EMPIRICAL RELATIONSHIP BETWEEN SIZE AND COST

3.1 Concept of Cost Defined in this Study

The major element of costs in commercial banks are :

(a) Interest payment on time and savings deposits;

(b) Wages and salaries (including bonus, over-time and other allowances);

(c) Other costs comprising of printing and stationery, postage, telegrams and telephones, rent for premises, depreciation of physical assets, etc.

Thus, bank's costs can be classified into interest cost (item a) and non-interest cost or operating cost (items b & c).

The percentage of different costs in total costs in rural and urban branches in the present study for the year 1979 are presented in Table 3.1. It becomes clear from the table that interest cost occupies major share in total costs and that interest cost is higher in urban branches than in rural branches. However, in the smallest size groups in rural and urban branches, the percentage share of wage-salary cost to total cost is (53.97% and 39.32% in rural and urban branches) higher than interest cost (25.14% in rural and 32.17% in urban branches).

In order to examine size-cost relationship, operating cost, i.e., non-interest cost, rather than total costs in

Table 3.1 : Classification of Different Costs by Size-Groups of Rural, Urban and All Branches - 1979.

Category of branch	Branch size (Volume of Business in lakhs and crores of Rupees)	No.of branches	Percentage of				
			Wage-salary cost to total cost	Other cost to total cost	Operating cost to total cost	Interest cost to total cost	Total cost
			1	2	1+2=3	4	3+4=5
R	Less than 10 lakhs	19	53.97	20.89	74.86	25.14	100.0
U	10-50 lakhs	61	34.41	13.27	47.68	52.32	100.0
R	50 lakhs-1 crore	32	23.06	8.33	31.39	68.31	100.0
A	1-5 crores	29	21.80	10.12	31.92	68.08	100.0
L	All Rural Branches	141	31.88	12.54	44.42	55.58	100.0
U	10-50 lakhs	6	39.32	28.50	67.83	32.17	100.0
R	50 lakhs-1 crore	15	25.58	8.34	33.92	66.08	100.0
B	1-5 crores	43	22.50	7.43	29.93	70.07	100.0
A	5-10 crores	6	23.48	7.06	30.54	69.46	100.0
N	Above 10 crores	5	14.90	-	14.90	85.10	100.0
	All Urban Branches	80	23.96	8.60	32.56	67.44	100.0
ALL BRANCHES	Less than 10 lakhs	19	53.97	20.89	74.86	25.14	100.0
	10-50 lakhs	67	34.85	14.66	49.51	50.49	100.0
	50 lakhs-1 crore	47	23.06	8.33	32.19	67.81	100.0
	1-5 crores	77	22.27	9.41	30.67	69.33	100.0
	5-10 crores	6	23.48	7.06	30.54	69.46	100.0
	Above 10 crores	5	14.90	-	14.90	85.10	100.0
	All Branches	221	29.19	10.93	40.12	59.88	100.0

Source: Calculated on the basis of 1979 data given in Appendix Table-1.

considered in the present study. Operating cost is the cost incurred in order to provide services to different customers including borrowers and depositors. Operating cost includes wage-salary cost and all other expenses (printing and stationery, postage, rent, telephones, telegrams, etc.) excluding interest cost. Interest cost is an indicator of volume of business itself, as it is more or less in proportion to deposits and borrowings (Table 3.1). Little differences in proportions to volume of business for various groups of branches as seen from Table 3.2 are due to variation in deposit/advance proportions and deposit-mix. Therefore, it is rightly argued that it is the operating cost, instead of total cost, which might exhibit economies/diseconomies of scale in banking.[1]

Table 3.2 : Size and Ratio of Interest Cost to Volume of Business. (Figures in Percentage)

Branch Size (Volume of Business)	Branches		
	Rural	Urban	All
Less than Rs.10 lakh	3.07	-	3.07
Rs.10-50 lakh	4.03	3.27	4.16
Rs. 50 lakh-1 crore	4.55	4.77	4.67
Rs.1-5 crore	4.20	4.62	4.50
Rs.5-10 crore	-	3.99	3.99
Above Rs.10 crore	-	4.32	4.32
All Branches	4.06	4.55	4.22

Source: Calculated on the basis of 1979 data given in Appendix Table 1.

It follows from the foregoing discussion that it would be more appropriate to analyse economies of scale with respect to operating cost. Further, it becomes obvious from Table 3.1 that wage-salary cost accounts for a very large proportions of operating cost (71.77%, 73.76% and 72.70% in operating cost in rural, urban and all branches respectively) Therefore, it would also be interesting to examine economies of scale with respect to wage-salary cost.

Ratio of operating cost to volume of business and ratio of wage-salary cost to volume of business indicate operating cost and wage-salary cost per unit of output, i.e., volume of business.* Given the volume of business, a lower operating cost and wage-salary cost-ratio, indicate that as size of branches increase operating cost and wage-salary cost tend to decline.

3.2 Interpretation of Size-Cost Relationship

For understanding the relationship between size and cost (i.e. operating and wage-salary cost) and the effect of Rural and Urban environment on costs in different size-groups of rural and urban branches, the technique of simple averages and coefficient of variation have been employed. Some evidence concerning the relationship between size of the branch and cost can be seen from the behaviour of these costs, namely

* Henceforth, for the sake of convenience, the word operating cost and wage-salary cost is used instead of unit operating cost and unit wage-salary cost per given volume of business.

operating and wage-salary cost, in rural and urban branches.

Tables 3.3 and 3.4 show simple average and relative dispersion in operating and wage-salary cost in different size-groups of rural and urban branches and all branches for 1978 and 1979 respectively. The mean value of operating and wage-salary cost, expressed in percentage, indicate the average operating and wage-salary cost of rural and urban branches in different size groups. Whereas, the coefficient of variation shows the deviation from the mean value in operating and wage-salary cost within different size groups of branches.

Following conclusions are drawn from the analysis of Tables 3.3 and 3.4.

(i) It is seen from the tables that as the size of rural and urban branches increases, the ratio of operating cost to volume of business and the ratio of wage-salary cost to volume of business, (i.e. unit operating and wage-salary cost) have tendency to decline. Thus, there is inverse relationship between operating cost and size in rural and urban branches.

(ii) Since wage-salary cost constitutes major share in operating cost, the fall in unit operating cost is due to fall in unit wage-salary cost. Thus, the differences in operating

Table 3.3 : Simple Average and Relative Dispersion in Operating Cost and Wage-Salary Cost in Different Size-Groups, 1978.

Branch-size (Volume of business) in lakhs and crores of rupees)	No. of branches	Ratio of Operating cost to volume of Business (in percentages)		Ratio of Wage-Salary cost to volume of business) in percentage)	
		Mean	Coefficient of variation	Mean	Coefficient of variation
RURAL BRANCHES :	54	10.70	0.92	6.51	0.70
Less than 10 lakh					
10-50 lakh	40	2.94	0.42	2.17	0.30
50 lakh-1 crore	35	1.60	0.89	1.21	0.36
1-5 crore	17	1.20	0.33	0.95	0.31
5-10 crore	-	-	-	-	-
Above 10 crore	-	-	-	-	-
All Branches	126	4.33	1.43	2.77	1.19
URBAN BRANCHES					
Less than Rs.10 lakh	-	-	-	-	-
10-50 lakh	14	4.94	0.85	2.63	0.46
50 lakh-1 crore	13	1.92	0.41	1.41	0.36
1-5 crore	45	1.63	0.37	1.26	0.37
5-10 crore	3	1.04	0.44	0.83	0.56
Above 10 crore	4	1.08	0.50	0.87	0.47
All Branches	79	2.26	1.02	1.49	0.59
ALL BRANCHES					
Less than 10 lakh	34	10.70	0.92	6.51	0.70
10-50 lakh	54	3.46	0.72	2.92	0.42
50 lakh-1 crore	48	1.64	0.75	1.27	0.37
1-5 crore	62	1.51	0.39	1.17	0.35
5-10 crore	3	1.04	0.44	0.83	0.56
Above 10 crore	4	1.08	0.50	0.87	0.47
All Branches	205	3.53	1.46	2.28	1.19

Note: In rural branches, there are no branches having volume of business more than Rs.5 crore. Similarly, in urban branches, there are no branches having business less than Rs.10 lakh.

Source: Calculated on the basis of 1978 data given in Appendix Table-1.

Table 3.4 : Simple Average and Relative Dispersion in Operating cost and wage-salary cost in Different Size-Groups of Rural, Urban and All Branches, 1979.

Branch Size (Volume of Business) in different groups	No.of branches	Ratio of Operating cost to Vol.of branches (in per-centage)		Ratio of Wage-salary cost to Vol.of Business(In per-centage)	
		Mean	Coefficient of variation	Mean	Coefficient of variation
RURAL BRANCHES					
Less than Rs.10 lakh	19	10.06	0.96	7.36	1.15
10-50 lakh	61	3.17	0.41	2.38	0.44
50 lakh-1 crore	32	1.91	0.38	1.22	0.37
1-5 crore	29	1.27	0.40	1.01	0.40
5-10 crore	-	-	-	-	-
Above 10 crore	-	-	-	-	-
All Rural Branches	141	3.33	1.38	2.52	1.48
URBAN BRANCHES					
Less than Rs.10 lakh	-	-	-	-	-
Rs.10-50 lakh	6	4.91	0.62	2.82	0.42
Rs.50 lakh-1 crore	15	2.45	0.46	1.80	0.36
Rs.1-5 crore	44	1.62	0.39	1.26	0.36
Rs.5-10 crore	6	1.66	0.22	1.30	0.28
Above Rs.10 crore	5	0.91	0.44	0.69	0.46
All Urban Branches	80	1.99	0.70	1.49	0.50
ALL BRANCHES					
Less than Rs.10 lakh	19	10.06	0.96	7.36	1.15
Rs.10-50 lakh	67	3.13	0.53	2.43	0.43
Rs.50 lakh-1 crore	47	1.76	0.49	1.41	0.41
Rs.1-5 crore	77	1.49	0.41	1.17	0.39
Rs.5-10 crore	6	1.66	0.22	1.30	0.28
Above Rs.10 crore	5	0.91	0.44	0.69	0.46
All Branches	221	2.84	1.39	2.13	1.43

Source: Calculated on the basis of 1979 data given in Appendix Table-1.

Note: In rural branches, there are no branches having volume of business more than Rs.5 crore. Similarly, in urban branches, there are no branches having volume of business less than Rs.10 lakh.

cost in different size groups in rural and urban branches may be mainly due to differences in wage-salary cost.

(iii) It is also observed from the tables, that unit operating cost is the highest in the smallest size group of branches and lowest in thelargest size group of branches in rural and urban area. Thus, larger branches are more efficient than smaller branches both in rural and urban area.

(iv) It can also be observed from the tables, that within comparable size groups, (i.e. 10-50 lakhs, 50 lakhs-1 crore and 1-5 crore Rs.) in rural and urban branches, unit operating cost and unit wage salary cost are found to be higher in urban branches than in rural branches. It seems therefore, that rural branches are more cost efficient than urban branches within comparable size-groups of branches.

(v) The tables also reveal that the dispersion in operating cost and wage-salary cost from the mean value is more in the smallest size group in rural branches than in urban branches in 1978 and 1979 . The dispersion is the lowest in the largest size group in rural branches in 1978, whereas in case of urban branches, we find more fluctuations in the larger size-group of branches.

On the basis of the above analysis, following hypotheses are postulated :

(c) There is inverse relationship between size of the branch and unit cost, that is to say unit operating cost and unit wage-salary cost tend to decline with the increase in size of the branch. Thus, economies of scale exist at branch level.

(b) For comparable size-groups, rural branches are more cost efficient than urban branches and economies of scale are more pronounced in rural branches than in urban branches.

3.3 Measurement of Economies of Scale

Out of three main techniques used for measuring economies of scale, namely statistical cost approach, the survivor technique and engineering approach, the technique of statistical cost approach is used in the present study to measure economies of scale at branch level. The method essentially uses cross-sectional data to find the relationship between size and cost.

Accordingly, the relationship between size and operating cost; and size and wage-salary cost have been examined separately.

Regression analysis has been employed to examine empirically the postulated relationship between size and cost.

To decide which cost function fits well to the data ~~for~~ for examining the relationship between size and operating cost and wage-salary cost, a scatter

diagram was drawn with the help of the original values of dependent variables, i.e., (i) ratio of operating cost to volume of business (C_1) (ii) ratio of wage-salary cost to volume of business (C_2) and explanatory variable, i.e., volume of business (X).

The scattergram was drawn seperately for rural, urban and all branches with the help of 1979 data.

First of all, simple linear function was fitted, but as it was 'poor-fit' and therefore a semi-logarithmic function was fitted, expressing size variable in common logarithm. It is argued, that the use of logarithmic function allows the estimated cost curve to be virtually of the theoretically recognised shape.[2] There was improvement in the results, but in terms of total explanation, the fit was still found to be poor.

As the curvilinearity in the scatter was found, an additional term X^2 was added inthe cost function and semi-logarithmic quadratic cost function, expressing size variable (X) in common logarithm, was also fitted. Because of the inherent characteristic of quadratic cost-function, the estimated cost curve was U-shaped, whereas the scattergram gave the shape like asymptotic curve showing decline in operating and wage--salary cost.

On the basis of scattergram and regression results, finally, linear and double-log cost functions have been selected as follows :

(1) $C_1 = a + bx + U$

(2) $C_2 = a + bx + U$

(3) $\log C_1 = \log a + b \log x + U$

(4) $\log C_2 = \log a + b \log x + U$

where,

C_1 = Ratio of operating cost to volume of business (in percentage)

C_2 = Ratio of wage-salary cost to volume of business (in percentage)

a = constant

b = Regression coefficient

X = Volume of business

U = Error term.

Equations (1) and (2) test the hypothesis that operating and wage-salary cost are linear functions of size, i.e., volume of business. This linear form postulates that operating and wage-salary costs change by a fixed amount (measured in ratio form which means percentage point) for any given change in size. For example, if the coefficient b = -0.01, it means that the ratio of operating cost or wage-salary cost to volume of business decreases by 1 percentage point as size increase by one unit.

Equations (3) and (4) are double log functions. In these functions, the slope coefficient, b, measures the elasticity of C with respect to X, i.e., the percentage change in C for a given percentage change in X. In this way, double-log function gives directly the cost elasticity with respect to rural, urban and all branches.

As referred to earlier, the scattergram gave asymptotic cost curves. Hence, for fitting the cost curve, the double-log cost functions are represented as follows :

$$C_1 = A\, x^{-b} \qquad \ldots(1)$$

$$C_2 = A\, x^{-b} \qquad \ldots(2)$$

3.6 Empirical Findings

Operating and wage-salary cost have been estimated with the help oflinear and double-log cost functions for all rural and urban branches for 1978 and 1979. The results for linear relationship with respect to operating and wage-salary cost are presented in tables 3.5 and 3.6 respectively, whereas results of double-log function with respect to operating and wage-salary cost are presented in tables 3.7 and 3.8 respectively.

I Relationship Between Size and Cost: Linear Relationship.

When operating and wage-salary cost are regressed on size, fitting linear model for rural, urban and all branches in 1978 and 1979, following conclusions are derived.

(i) It is obvious from tables 3.5 and 3.6 that the regression coefficient, b, is found to be statistically significant, except for operating cost in urban branches in 1979, with expected negative sign. This negative relationship between size and cost, i.e., operating and wage-salary cost, substantiates the hypothesis of economies of scale at branch level.

(ii) It is also apparent from the tables that, with the help of size variable, the extent of explanation provided for variation in operating and wage-salary cost is hardly more than 10 per cent in rural, urban and all branches. However, the coefficients of determination, R^2, are found to be statistically significant except for operating cost in urban branches for 1979.

It is interesting to note that, even with low value, R^2 is found to be statistically significant. This may be due to larger number of observations.

(iii) As far as the effect of rural-urban environment, on operating and wage-salary cost is concerned, it is obvious

Table 3.5 : Regression Results:Linear Model.

Category of Branch	Year	Size and Operating Costs Ratio Dependent variable: Ratio of operating cost$ to volume of Business. Ind.Variable: Volume of business a	b	R^2	F-Ratio
Rural Branches	1978	5.1825	-0.025** (3.3850)	0.4762**	11.4580 (1,139)
	1979	4.6792	-0.0214** (4.1290)	0.1096**	17.0490 (1,139)
Urban Branches	1978	2.4780	-0.0008* (1.9570)	0.424*	3.4490 (1,78)
	1979	3.5018	-0.0014 (0.9570)	0.0110	0.9780 (1,78)
All Branches	1978	3.5320	-0.0018* (2.050)	0.0186*	4.2050 (1,219)
	1979	3.5038	-0.0016* (1.7130)	0.0158*	2.9350 (1,219)

Notes:

1. ** Significant at 1 per cent level.
   * Significant at 5 per cent level.
2. Figures in parenthesis below regression coefficients are t-values and below F-ratio are degree of freedom.
3. Results are obtained from computer on the basis of 1978 and 1979 data given in appendix No.1. However, for running regression individual branch data are used.

from the tables that size-cost relationship is stronger in terms of total explanation, in rural branches than in urban branches.This can be seen from the values of R^2 for rural and urban branches for both operating and wage-salary cost in 1978 and 1979.

It appears that linear model is a 'poor fit' in terms of R^2 for explaining variation in operating and wage-salary cost in all, rural, and urban branches.

Table 3.6 : Regression Results : Linear Model.

Category of Branch	Year	Size and Wage-salary costs Ratio Dependent Variable: Ratio of wage-salary costs to volume of business Independent Variable: Volume of Business			
		a	b	R^2	F-ratio
Rural Branches	1978	3.1471	-0.0155** (3.5120)	0.0512**	12.3390 (1,139)
	1979	3.4810	-0.0155** (3.6580)	0.0376**	13.3790 (1,139)
Urban Branches	1978	1.5738	-0.0004* (2.2330)	0.0600**	4.9880) (1,78)
	1979	1.7350	-0.0005* (2.1600)	0.0566**	4.6650 (1,78)
All Branches	1978	2.2095	-0.0010** (2.80)	0.0193**	4.3260 (1,219)
	1979	2.3493	-0.0011* (2.1570)	0.0207**	4.6550 (1,219)

Notes:

1. ** Significant at 1 per cent level.
   * Significant at 5 per cent level.
2. Figures in parenthesis below regression coefficients are t-values and below F-ratio are degree of freedom.
3. Results are obtained from computer on the basis of 1978 and 1979 data given in appendix table No.1. However, for running regression individual branch data are used.

II. Relationship Between Size and Cost: Double-Log Relationship.

To explore further the relationship between size and cost, i.e., operating and wage-salary cost, double-log function as stated in equations (3) and (4) has been fitted. The results are presented in Tables 3.7 and 3.8.

Table 3.7 : Regression Results : Double-Log Model.

Category of Branch	Year	Size and Operating Cost Ratio Dependent Variable: Ratio of Operating Cost to volume of Business Independent Variable: Volume of Business			
		a	b	R^2	F-ratio
Rural Branches	1978	2.5954	-0.4066** (14.8176)	0.6448**	219.562 (1,121)
	1979	2.9536	-0.5950** (22.1054)	0.7785**	488.650 (1,139)
Urban Branches	1978	2.1324	-0.3135** (5.1400)	0.4658**	66.2003 (1,76)
	1979	2.7226	-0.4054** (6.6763)	0.3636**	44.5723 (1,78)
All Branches	1978	2.3260	-0.3791** (16.9025)	0.5894**	285.694 (1,199)
	1979	2.4553	-0.3995** (15.0480)	0.5342**	251.159 (1,219)

Notes:

1. ** Significant at 1 per cent level.
   * Significant at 5 per cent level.
2. Figures in parenthesis below regression coefficients are t-values and below F-ratio are degree of freedom.
3. Results are obtained from computer on the basis of 1978 and 1979 data given in appendix table No.1. However, for running regression individual branch data are used.

Following conclusions are derived from the results of tables 3.7 and 3.8.

(i) It is observed from the tables that there is negative relationship between size of the branch and cost, i.e., operating and wage-salary cost. This is confirmed by the values of b, the regression coefficient. The regression coefficient, b,

Table 3.8 : Regression Results : Double-Log Model.

Category of Branches	Year	Size and Wage Salary Cost# Ratio Dependent Variable: Ratio of Wage-Salary cost# to volume of business. Independent-Variable: Volume of Business a	b	R^2	F-Ratio
Rural Branches	1978	2.1286	-0.4426** (13.5993)	0.6182**	193.952 (1,121)
	1979	2.4913	-0.5935** (16.2212)	0.6643**	263.128 (1,139)
Urban Branches	1978	1.6204	-0.2697** (6.3524)	0.3888**	40.3359 (1,76)
	1979	1.8555	-0.2989** (6.4901)	0.3507**	42.1217 (1,78)
All Branches	1978	1.8739	-0.3433** (15.7830)	0.5565**	249.576 (1,199)
	1979	1.9791	-0.3596** (14.9345)	0.5046**	223.033 (1,219)

Notes:

1. ** Significant at 1 per cent level.
   * Significant at 5 per cent level.
2. Figures in parenthesis below regression coefficients are t-values and below F-ratio are degree of freedom.
3. Results are obtained from Computer on the basis of 1978 and 1979 data given appendix Table No.1. However, for running regression individual branch data are used.

for operating cost and wage-salary cost function is found to be statistically significant at 1% level with expected negative sign in all, rural, and urban branches.

The value of regression coefficient for all branches for operating cost is -0.3791 and -0.3995 in 1978 and 1979 respectively, whereas for wage-salary cost it is -0.3433 and

-0.3596 in 1978 and 1979 respectively. This implies that an increase in size by 1% would lead, on an average, 0.38% and 0.40% decrease in operating cost and 0.34% and 0.36% decrease in wage-salary cost.

However, the effect of environment, in terms of size of rural and urban branches, on operating and wage-salary cost is different. The effect of size on cost, both operating and wage-salary cost, is found to be stronger in case of rural branches than in case of urban branches. This is obvious from the respective cost elasticities in rural and urban branches. The cost elasticity in rural branches for operating cost is 0.4866 and 0.5859 in 1978 and 1979 respectively, and for wage-salary cost it is 0.4426 and 0.5335 in 1978 and 1979 respectively; whereas the cost elasticity in urban branches for operating cost is 0.3133 and 0.4058 in 1978 and 1979 respectively, and for wage-salary cost is 0.2697 and 0.2939 in 1978 and 1979 respectively.

(ii) It is also observed from the tables that the double-log function explains larger percentage variation in operating and wage-salary cost than linear function. The coefficients of determination, R^2, with respect to operating cost and wage-salary costs are found to be statistically significant in rural, urban and all branches. The values of R^2 in all branches for operating cost are 0.5094 and 0.5342 in 1978 and 1979 respectively, and for wage-salary cost are 0.5564 and 0.5046 in 1978 and 1979

respectively, whereas the values of R^2 in rural branches for operating cost are 0.6448 and 0.7785 in 1978 and 1979 respectively, and for wage-salary cost are 0.6182 and 0.6543 in 1978 and 1979 respectively. Similarly, the values of R^2 in urban branches in 1978 and 1979 for operating cost are 0.4656 and 0.3636 respectively, and for wage-salary cost are 0.3868 and 0.3507 respectively.

(iii) It is interesting to note that in rural branches the size variable, i.e., volume of business (X) is found to have more influence on operating and wage-salary cost, whereas in urban branches there may be other more important variables than size which influence operating and wage-salary cost. This is obvious from the values of R^2 in rural and urban branches for operating and wage-salary cost.

Thus, the regression results substantiate the postulated negative relationship between size and cost (both for operating and wage-salary cost). In other words, economies of scale exist in banking industry at branch level. However, economies of scale are more pronounced in rural branches than urban branches.

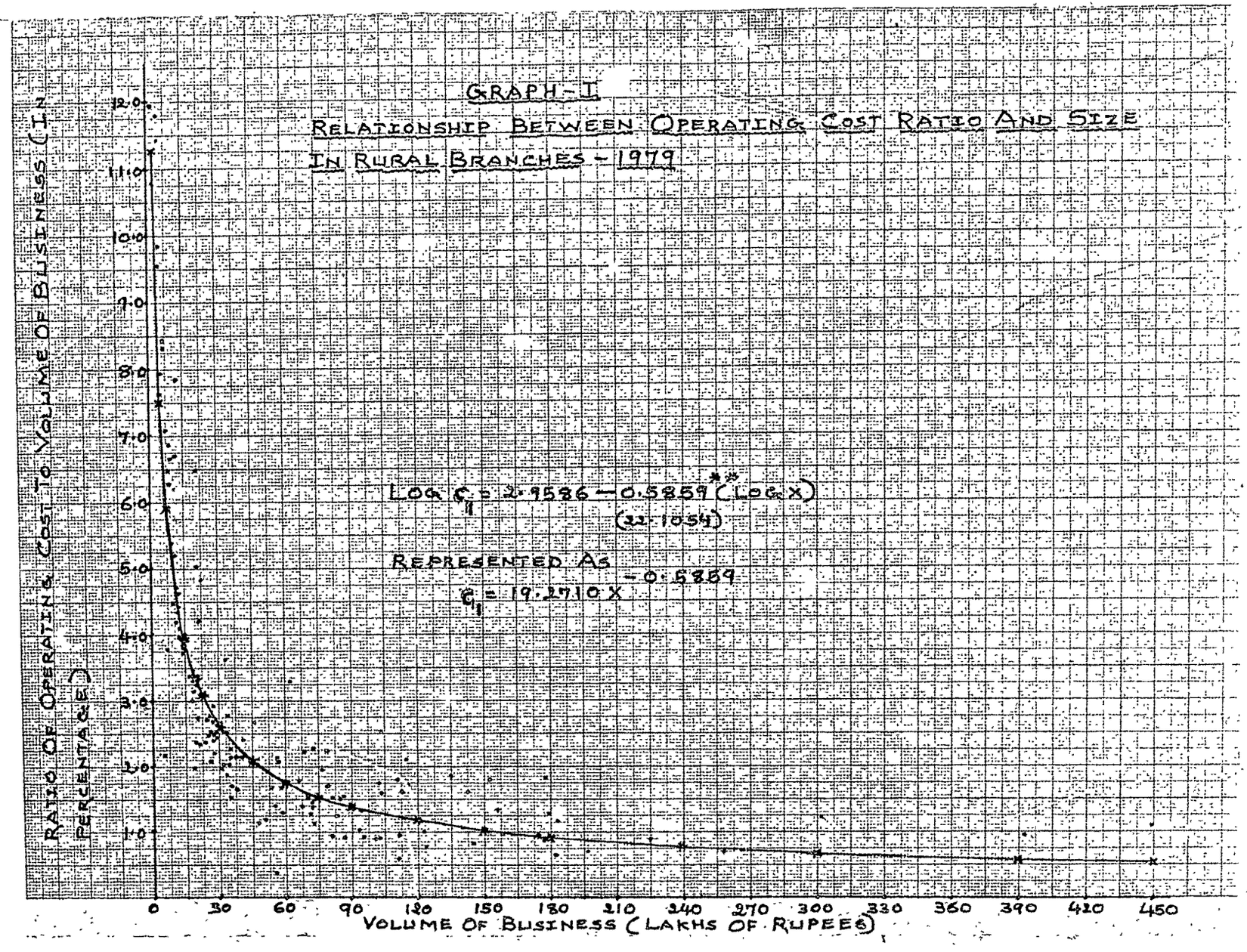
III Efficiency of Rural Versus Urban Branches

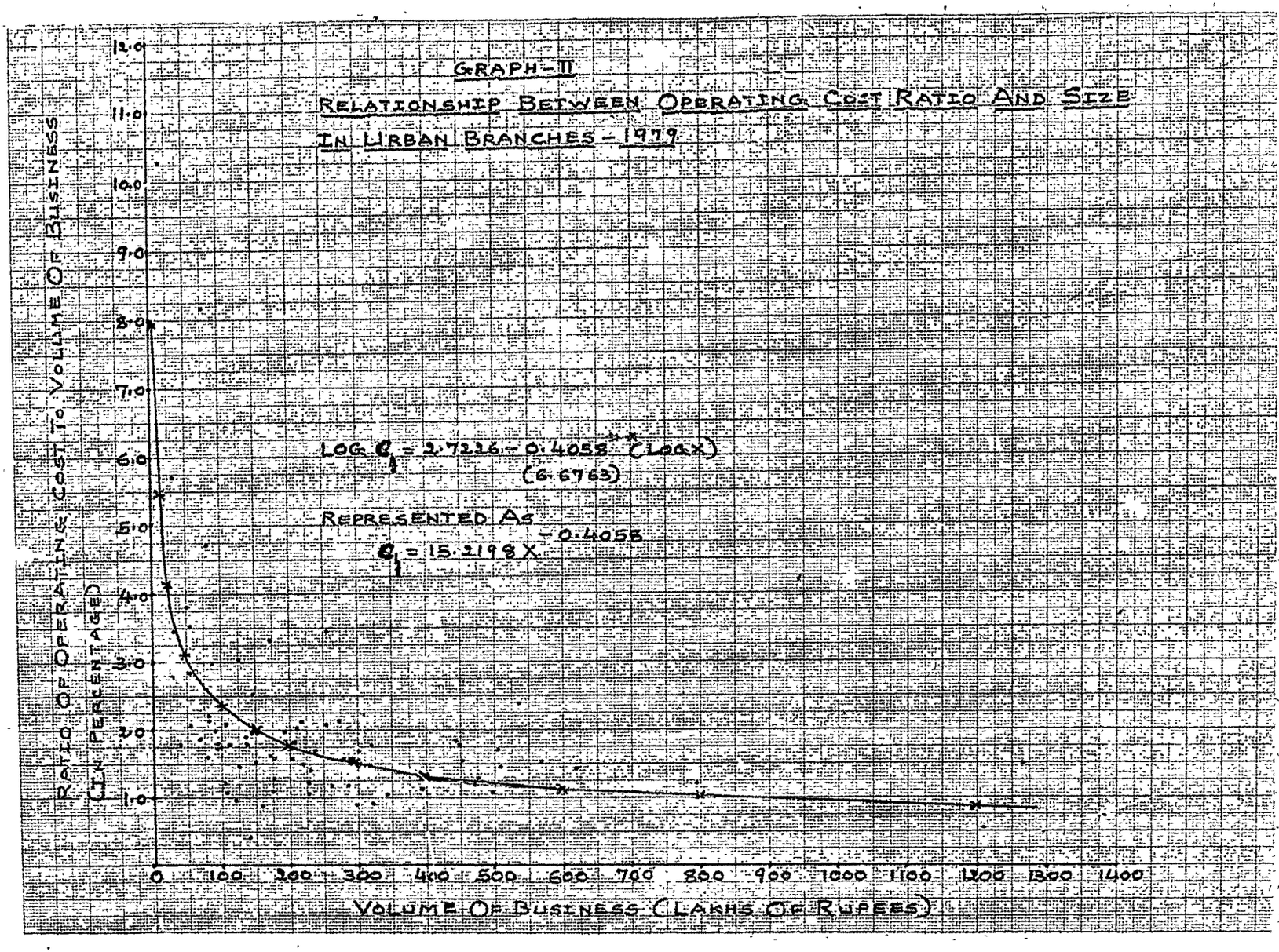
The efficiency of rural versus urban branches is examined, firstly by graphical presentation of regression results and secondly by productivity measure.

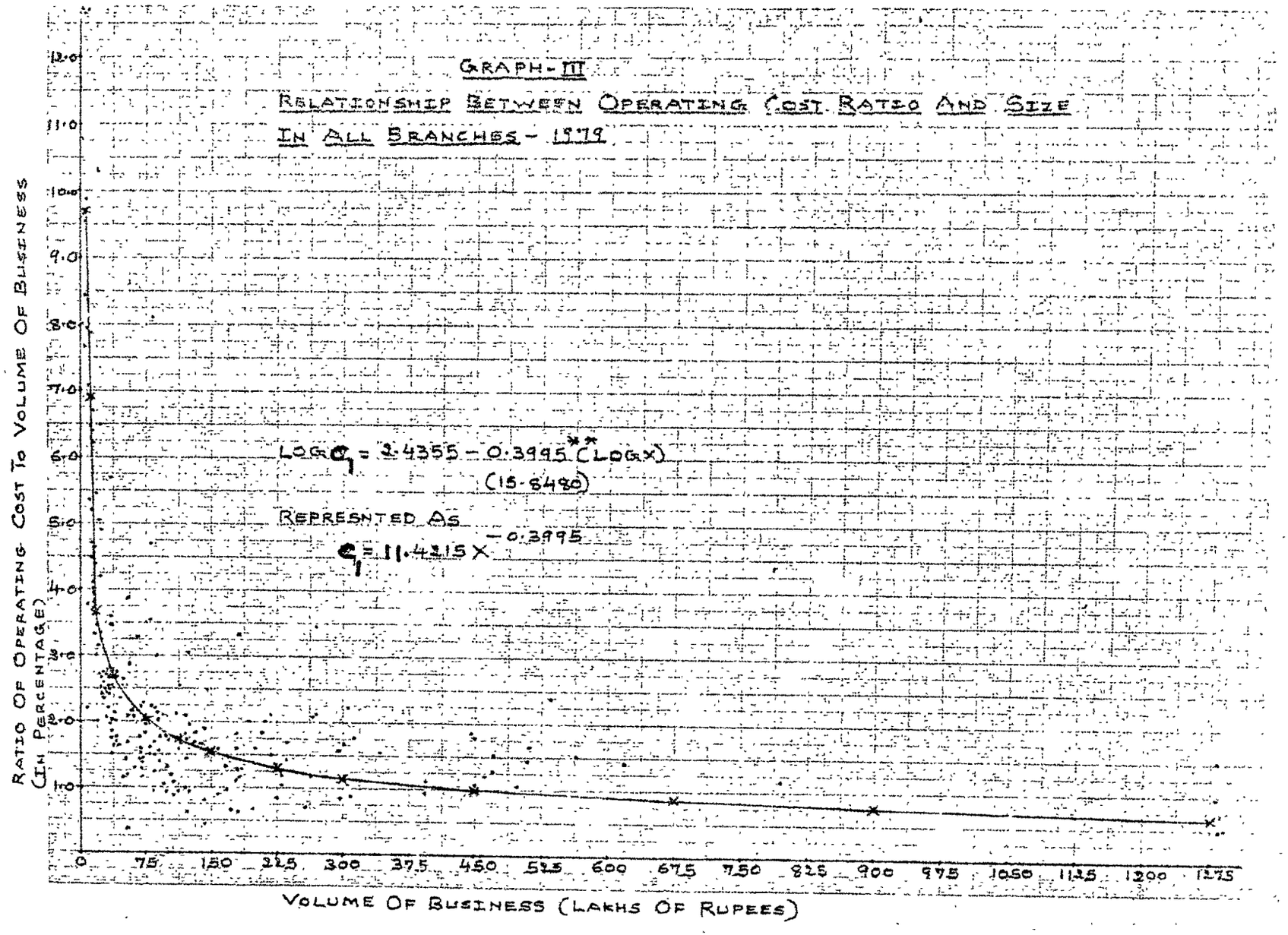
(A) Graphical Presentation of Regression Results

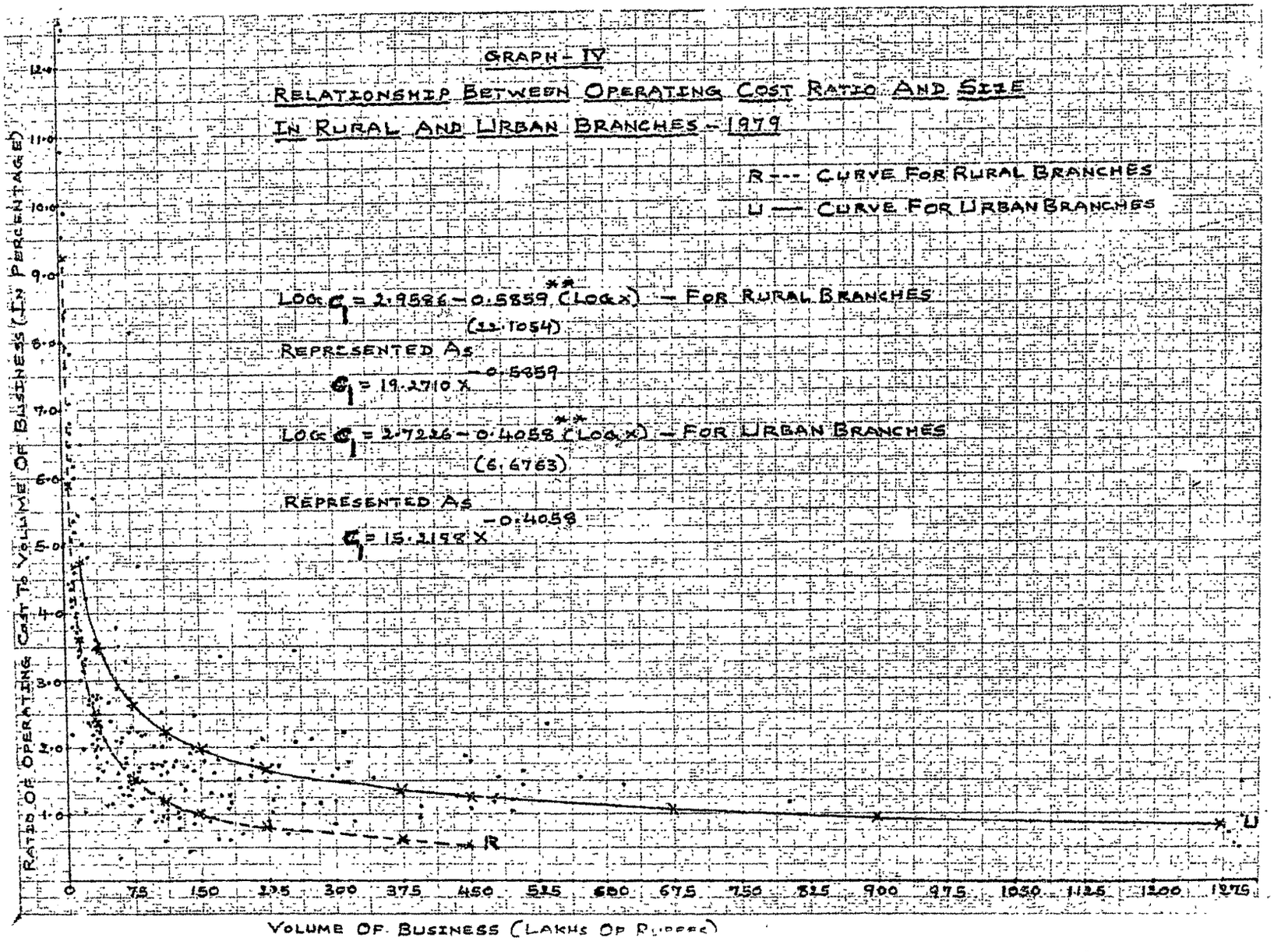
The graphical presentation of the two functions, namely (1) operating cost and (2) wage-salary cost, is based on original values of explanatory variable (volume of business) and dependent variables (operating cost and wage-salary cost) for the year 1979 and on double-log cost function results for 1979. The relationship between size and operating cost for rural, urban and all branches are shown by the curve in graph I, II and III respectively. Graph IV shows the relationship between size and operating cost for rural and urban branches together. Similarly, the relationship between size and wage-salary cost for rural, urban and all branches are shown by the curve in graph V, VI and VII respectively, whereas graph VIII shows the relationship between size and wage-salary cost for rural and urban branches together. It is observed from the graphs that size-cost curves for rural and urban branches are like size-cost curves in other cost studies, in theory of firm, for substantiating the hypothesis of economies of scale, namely Silberston,[3] Johnston[4], Stigler[5], Hald and Whitcomb,[6] etc.

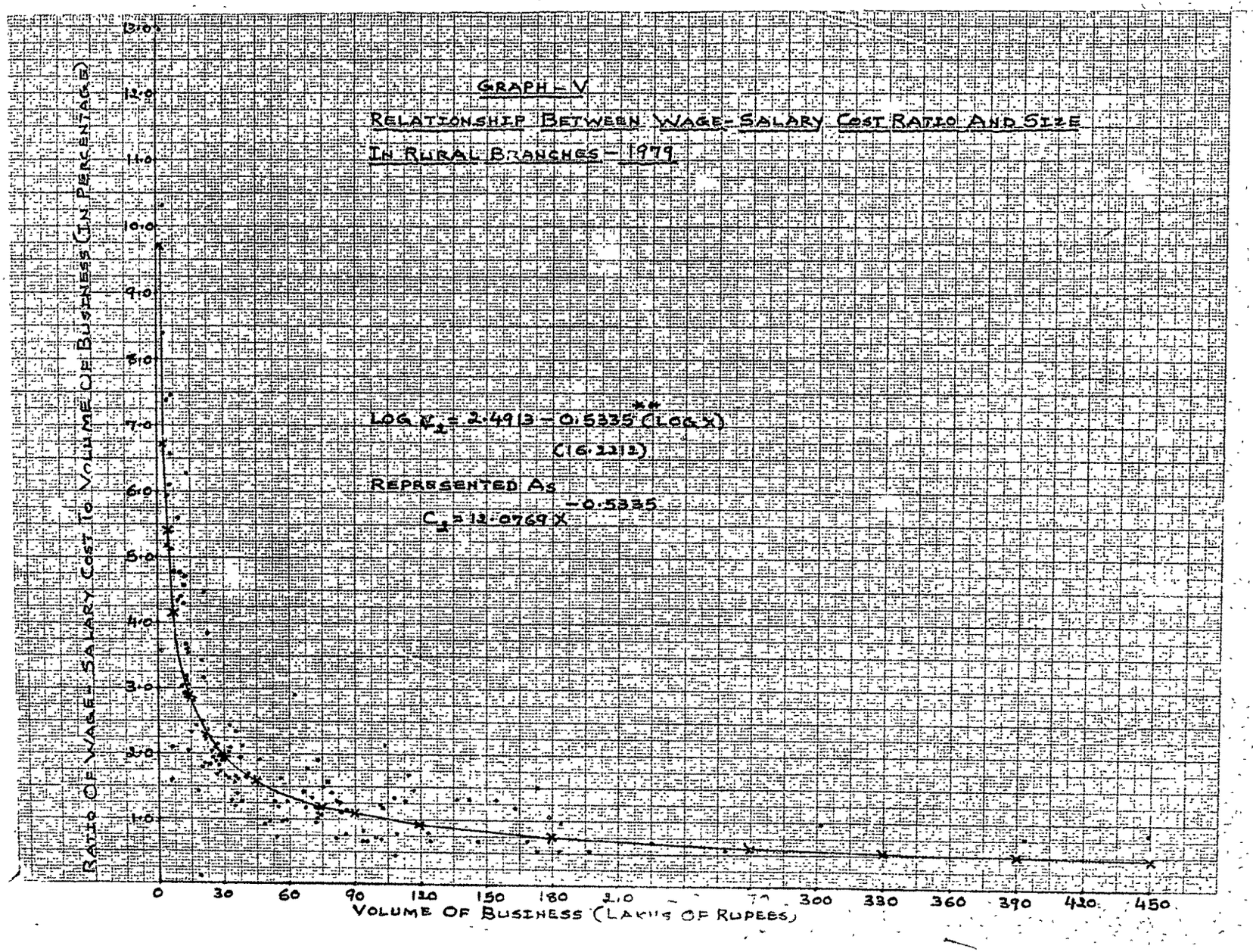
It is also seen from graph IV, where size-cost curves for rural and urban branches are presented together, that the operating cost in urban branches is higher than in rural branches. The cost elasticity with respect to operating cost

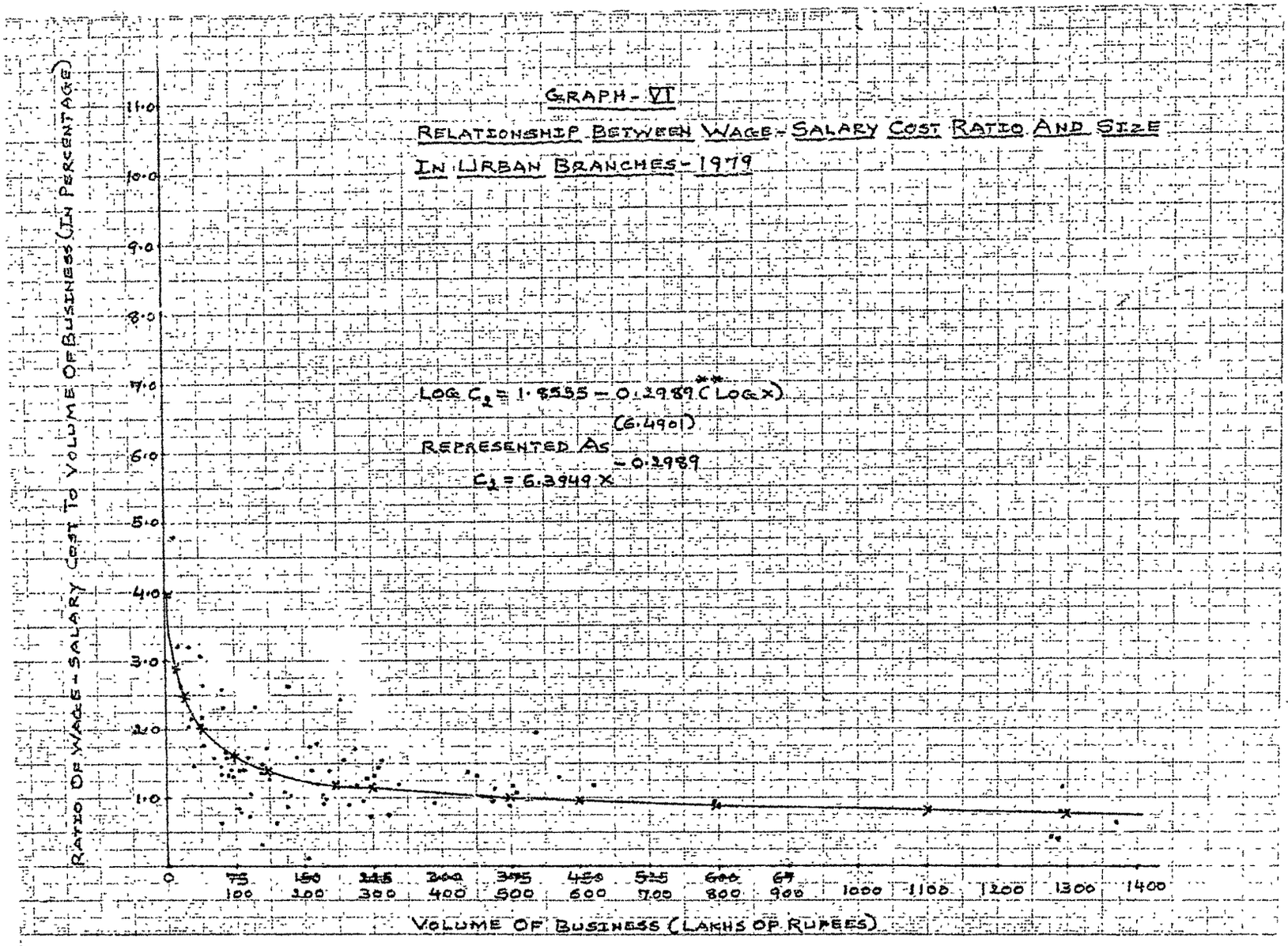

GRAPH-I
RELATIONSHIP BETWEEN OPERATING COST RATIO AND SIZE
IN RURAL BRANCHES - 1979
LOG C_1 = 2.9586 − 0.5859** (LOG X)
(32.1054)
REPRESENTED AS
C_1 = 19.2710 X^−0.5859
RATIO OF OPERATING COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
30
60
90
120
150
180
210
240
270
300
330
360
390
420
450
VOLUME OF BUSINESS (LAKHS OF RUPEES)

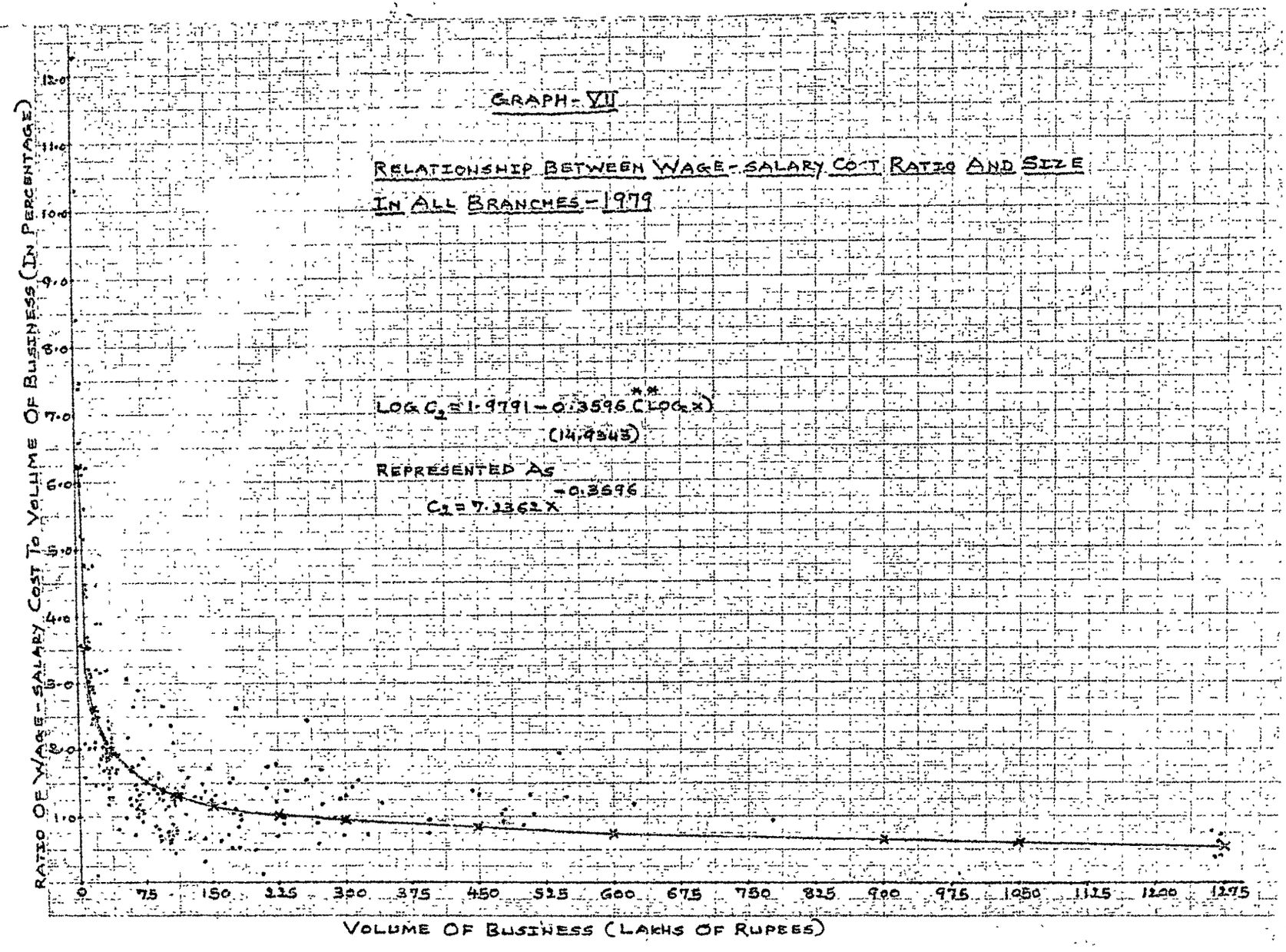

GRAPH-II
RELATIONSHIP BETWEEN OPERATING COST RATIO AND SIZE
IN URBAN BRANCHES - 1979
LOG C_1 = 2.7236 - 0.4058** (LOGX)
(6.6763)
REPRESENTED AS $C_1 = 15.2198 X^{-0.4058}$
RATIO OF OPERATING COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
VOLUME OF BUSINESS (LAKHS OF RUPEES)

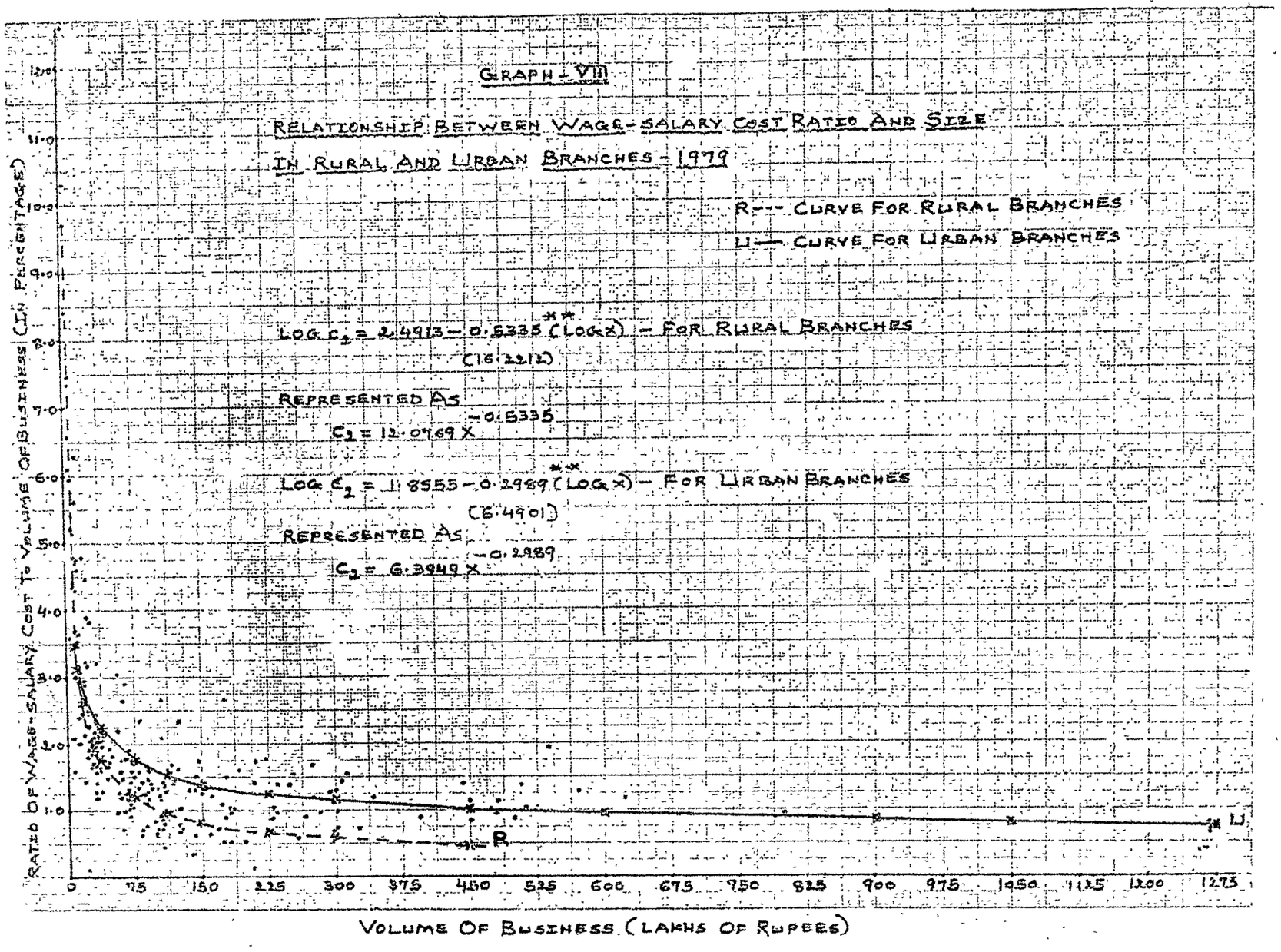

GRAPH - III
RELATIONSHIP BETWEEN OPERATING COST RATIO AND SIZE IN ALL BRANCHES - 1979
LOG C_1 = 3.4355 − 0.3995 * (LOG X)
(15.8480)
REPRESNTED AS
$C_1 = 11.4215 X^{-0.3995}$
RATIO OF OPERATING COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
VOLUME OF BUSINESS (LAKHS OF RUPEES)
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
75
150
225
300
375
450
525
600
675
750
825
900
975
1050
1125
1200
1275


GRAPH - IV
RELATIONSHIP BETWEEN OPERATING COST RATIO AND SIZE
IN RURAL AND URBAN BRANCHES - 1979
R --- CURVE FOR RURAL BRANCHES
U — CURVE FOR URBAN BRANCHES
LOG C_1 = 2.9586 − 0.5859 (LOG x) — FOR RURAL BRANCHES
(12.1054)
REPRESENTED AS
$C_1 = 19.2710\ X^{-0.5859}$
LOG C_1 = 2.7226 − 0.4058 (LOG x) — FOR URBAN BRANCHES
(6.6763)
REPRESENTED AS
$C_1 = 15.2198\ X^{-0.4058}$
RATIO OF OPERATING COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
VOLUME OF BUSINESS (LAKHS OF RUPEES)
0
75
150
225
300
375
450
525
600
675
750
825
900
975
1050
1125
1200
1275
U
R


GRAPH – V
RELATIONSHIP BETWEEN WAGE-SALARY COST RATIO AND SIZE
IN RURAL BRANCHES – 1979
LOG Y_c = 2·4913 – 0·5335** (LOG X)
(16·2212)
REPRESENTED AS
Y_c = 13·0769 X^-0·5335
RATIO OF WAGE-SALARY COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
VOLUME OF BUSINESS (LAKHS OF RUPEES)
13·0
12·0
11·0
10·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
1·0
0
30
60
90
120
150
180
210
300
330
360
390
420
450


GRAPH - VI
RELATIONSHIP BETWEEN WAGE-SALARY COST RATIO AND SIZE
IN URBAN BRANCHES - 1979
LOG C_2 = 1·8535 − 0·2989** (LOG X)
(6·490)
REPRESENTED AS
C_2 = 6·3949 $X^{-0.2989}$
RATIO OF WAGE-SALARY COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
11·0
10·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
1·0
0
75
100
150
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
VOLUME OF BUSINESS (LAKHS OF RUPEES)


GRAPH - VII
RELATIONSHIP BETWEEN WAGE-SALARY COST RATIO AND SIZE IN ALL BRANCHES - 1979
LOG C_2 = 1.9791 − 0.3596 (LOG x)**
(14.9543)
REPRESENTED AS
$C_2 = 7.1362\ X^{-0.3596}$
RATIO OF WAGE-SALARY COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
75
150
225
300
375
450
525
600
675
750
825
900
975
1050
1125
1200
1275
VOLUME OF BUSINESS (LAKHS OF RUPEES)


GRAPH - VIII
RELATIONSHIP BETWEEN WAGE-SALARY COST RATIO AND SIZE
IN RURAL AND URBAN BRANCHES - 1979
R--- CURVE FOR RURAL BRANCHES
U— CURVE FOR URBAN BRANCHES
LOG C_1 = 2.4913 − 0.5335 (LOG X) − FOR RURAL BRANCHES
(16.2212)
REPRESENTED AS
C_1 = 12.0769 $X^{-0.5335}$
LOG C_1 = 1.8555 − 0.2989 (LOG X) − FOR URBAN BRANCHES
(6.4901)
REPRESENTED AS
C_2 = 6.3949 $X^{-0.2989}$
RATIO OF WAGE-SALARY COST TO VOLUME OF BUSINESS (IN PERCENTAGE)
VOLUME OF BUSINESS (LAKHS OF RUPEES)
0
75
150
225
300
375
450
525
600
675
750
825
900
975
1050
1125
1200
1275
R
U

for rural and urban branches in 1979 is 0.5859 and 0.4058 respectively. This can be explained firstly by cost elasticity with respect to wage-salary cost for rural and urban branches in 1979, which is 0.5335 and 0.2989 respectively. Secondly, it can be explained with the help of table 3.2. It is observed that within comparable size-groups, (10-50 lakh Rs.50 lakhs to 1 crores and above Rs.1-5 crore) unit wage-salary cost is higher in urban branches than rural branches. This may be due to the constituents of wage-salary cost and other cost, namely rent for the premises, allowances and overtime to employees, telephones, telegram and telex expenses, number of clerical and officer staff, etc. Moreover, processing of ancilliary services like remittances, clearance of cheques, drafts, services provided to public institutions and to the government, etc., require more clerical staff and so involves higher wage-salary cost and hence higher operating cost in urban branches.

B. Efficiency in Term of Productivity of Labour

Efficiency of rural versus urban branches has also been measured with the help of productivity of labour measured in term of volume of business per employee; and with the help of relationship between unit wage-salary cost, volume of business per employee and wage-salary cost per employee. This relationship is presented in Table 3.9 with the help of 1979 data.

Table 3.9: Volume of Business per employee, wage-salary cost ratio, Wage-Salary Cost per employee and ratio of Officer to Clerical Staff in Rural, Urban and All Branches, 1979.

Branch size in different size-groups (Volume of Business in Lakhs and crores of Rs.)	No.of branches	Volume of business per employee (in Rs. lakhs)	Ratio of wage salary cost to volume of business (in Pers)	Wage-salary cost per employee (In Rs. lakhs)	Ratio of officer to clerical staff
RURAL BRANCHES					
Less than Rs.10 lakh	19	2.88	7.36	0.11	0.91
10-50 lakh	61	7.58	2.38	0.12	0.67
50 lakh-1 crore	32	12.90	1.22	0.12	0.61
1-5 crore	29	16.49	1.01	0.13	0.49
5-10 crore	-	-	-	-	-
Above 10 crore	-	-	-	-	-
All Branches	141	12.29	2.52	0.12	0.59
URBAN BRANCHES					
Less than Rs.10 lakh	-	-	-	-	-
10-50 lakh	6	5.39	2.82	0.10	0.67
50 lakh-1 crore	15	9.23	1.60	0.12	0.49
1-5 crore	48	12.48	1.26	0.13	0.43
5-10 crore	6	12.32	1.30	0.13	0.35
Above 10 crore	5	22.89	0.69	0.13	0.36
All Branches	80	15.06	1.45	0.13	0.40
ALL BRANCHES					
Less than Rs.10 lakh	19	2.88	7.36	0.11	0.91
10-50 lakh	67	7.35	2.43	0.11	0.67
50 lakh-1 crore	47	11.19	1.41	0.12	0.56
1-5 crore	77	13.46	1.17	0.13	0.44
5-10 crore	6	12.32	1.30	0.13	0.35
Above 10 crore	5	22.89	0.69	0.13	0.36
All Branches	221	14.50	2.13	0.13	0.45

Source: Calculated on the basis of 1979 data given in Appendix Table 1.

Note: In rural branches, there are no branches having volume of business more than Rs.5 crore. Similarly, in urban branches, there are no branches having volume of business less than

Following conclusions are derived from the analysis of Table 3.9.

(i) It is observed from the table that as the size of rural and urban branches increase, volume of business per employee has tendency to increase in rural and urban branches, except in the size-group of 1-5 crore rupees in urban branches. Further, volume of business per employee in the larger branches is higher than smaller branches in rural as well as in urban areas. Thus, larger branches are more efficient than smaller branches in terms of productivity of labour.

(ii) It is also interesting to note that within comparable size-group of branches (i.e. Rs. 10-50 lakh ; Rs.50 lakh-1 crore, and Rs.1-5 crore) volume of business per employees is greater in rural branches than in urban branches. It may be concluded, therefore, that rural branches are more efficient than urban branches in terms of productivity of labour within comparable size-group of branches.

(iii) The table also reveals that wage-salary cost per employee is less than volume of business per employee in different size-groups in rural and urban branches. Therefore, unit wage-salary cost declines with increase in size of rural and urban branches. This implies that rural and urban branches may increase their volume of business, even by increasing

total number of employees, with having only marginal impact on wage-salary cost. Because, wage-salary cost per employee increases marginally with increase in size of rural and urban branches. It seems, therefore, that wage-salary cost per employee is not a constraint on efficiency of rural and urban branches.

(iv) It is also observed from the table that wage-salary cost per employee has tendency to increase marginally or virtually remain constant, with the increase in size of rural and urban branches. This may perhaps be due to the fact that, as seen from the table, ratio of officer to clerical staff is lower in larger branches in rural and urban area. Therefore, the decline in unit wage-salary cost with increasing branch size does not simply reflect the differences in wage-salary cost per employee in rural and urban branches.

3.5 Conclusion

While summing up the discussion on size-cost relationship, following conclusions are derived.

(i) Regression results show that there is negative relationship between size and cost and as the size of the branches increases, there is steep fall in unit operating cost upto certain volume of business, i.e. Rs.100 lakhs in rural branches and Rs.150 lakhs in urban branches. Thus, the results validate the hypothesis of economies of scale at branch level.

(ii) One interesting conclusion which emerges from the empirical findings is that larger branches in rural as well as in urban area are found to be more cost efficient than smaller branches. It may be inferred from the results that most of the rural and urban branches have not yet attained certain size of operation (i.e. Rs.625 lakhs) upto which there is scope for reducing their unit-operating cost by reducing their unit-wage-salary cost.

(iii) One more conclusion which follows from the findings is that economies of scale are more pronounced in rural branches than in urban branches, therefore, size-cost relationship is stronger in rural branches than in urban branches. That is to say, size is found to have more influence on operating cost in rural branches. This is observed by the values of R^2, cost-elasticity, size-cost curve and volume of business per employee in rural and urban branches.

(iv) The results also show that the source of scale economies is to be found mainly in wage-salary cost.

REFERENCES

1. Rangrajan C. and Paul Mampilly, op.cit., p.249.
   — "Relationship of Bank Size and Bank Costs", Monthly Review, Federal Reserve Bankof Kansas City, February 1961, p.4.
2. Gramely, Lyle E., op.cit., p.4.
3. Silberston, A. "Economiesof Scale in Theory and Practice" Economic Journal, Special Issue, 1971.
4. Johnston, J.: Statistical Cost Analysis, New York,1970.
5. Stigler, George J.: Organization of Industry, Part II, Ch.VII, Homewood, 1968.
6. John Haldi and David Whitcomb: "Economies of Scale in Industrial Plants", in Readings in the Economics of Industrial Organization (Part II) by Needham Douglas (Ed.), New York, 1970, p.74.