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ABSTRACT

This paper attempts to determine alternative methods of benchmarking the efficiency of electric cooperatives. Using a panel composed of 119 Philippine electric cooperatives from 1990 to 2002, a cost function is estimated to identify appropriate cost variables that will determine the frontier. Based on this specification, efficiency frontiers are computed using Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA). The efficiency of each cooperative was then ranked and compared for consistency checks. Based on annual means from 1990 to 2002, the SFA reports that on the average, ECs are 40 percent away from the cost frontier while that of DEA estimates 42 percent. Since the DEA is able to identify peer groupings, the rankings and productivity values will prove to be useful for the energy regulator in determining targets for inefficient coops. Thus, these methodologies can prove to be useful in pursuing the Performance and Improvement Program (PIP) and Rehabilitation and Efficiency Plan (REP) to enable the coops to compete in the deregulated electricity environment.

I. Introduction

The past few years have witnessed an unparalled pace of reform in the electricity sector in the Philippines. With the passage of the Electric Power Industry Reform Act (EPIRA) in 2001, the restructuring and privatization of the power industry are under way. The purpose of this paper is to find other means of benchmarking electric cooperatives. The most common method of comparison or performance evaluation is ratio analysis that involves selecting two significant figures, expressing their relationship as a proportion or fraction. The most common types in the analysis of distributional firms are return to investment, number of employees per customer, load factor, system loss, and others. The main problem with this approach is that the overall performance of a coop is difficult to view holistically. These measures are often inadequate due to the existence of multiple inputs and outputs related to different resources, activities and environmental factors. Thus, this performance measurement system provides a very unbalanced picture of performance that can lead EC managers and regulators to miss important opportunities for improvement. Finding the appropriate measurement of relative efficiency through the use of multiple inputs and outputs has then become a key issue in benchmarking studies.

As an alternative to partial productivity estimates using ratios, this paper illustrates the use of Stochastic Frontier Analysis and Data Envelopment Analysis. The cost function for a panel of 119 Philippine electric distribution cooperatives is estimated as a basis for efficiency benchmarking. Benchmarking

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is a system in which the ratios of a firm's inputs to outputs, the production costs or quality are compared to external references. By comparing the costs of similar companies the regulator can establish a set of "yardsticks" of performance from which he could infer any one firm's attainable cost efficiency level. Benchmarking exercises make it possible to identify the scope for further efficiency improvements of each cooperative and to measure comparative improvement in their performance over time.

The purpose of this essay is to make a contribution to the method of assessing the efficiency of electric cooperatives in the Philippines. In the next five years, the ECs through the guidance of National Electrification Administration (NEA), need to pursue far reaching improvements in their performance. The EPIRA (Section 60) and its Implementing Rules and Regulations (Rule 31) states that the outstanding obligations of the ECs shall be assumed by Power Sector Assets and Liabilities Management Corporation (PSALM) in accordance with the rehabilitation and restructuring programs. Executive Order 119 outlines the restructuring program for cooperatives through the Performance Improvement Program (PIP) and the Rehabilitation and Efficiency Plan (REP) for cooperatives.

The present study makes an important contribution by being the first study to consider multi-output and input distance functions in assessing the efficiency of rural electric cooperatives. It is also the first to determine the peer cooperatives based on the relative size of its inputs and outputs. More importantly, the paper outlines a step by step approach as to the process involved in SFA and DEA analysis and the correct interpretation of the results.

The paper is organized as follows: Section 2 outlines the estimation procedure used in the study. Section 3 presents the results of SFA and DEA. The last section concludes and enumerates considerations for further studies.

II. Estimation Methods

A. Model Specification

The first step was the assumption of relationship to be estimated: (i) a cost function or (ii) a production function. After considering the studies in the past and the data obtained and after analyzing the inherent qualities of the electricity industry, it was decided that the cost function is a more appropriate specification. Since the cooperatives are under obligation to provide the electricity at specified tariffs, they must be able to meet the demand for their service without having able to choose the level of electricity that they will distribute. Given the exogeneity of the output levels, the ECs maximize profit simply by minimizing the cost of delivering a certain level of electricity.

Another issue that was decided on was what cost to focus on. Since the Philippine regulator, the Energy Regulatory Commission (ERC), as well as other regulators in other countries evaluates the performance of regulated firms using operating costs, ECs' non-power cost was chosen. Non-power cost is essentially total operating and maintenance expenditure defined as the sum of distribution, consumer accounts, administrative and general expenses.

Having specified the function to be estimated, the input and output variables that should be included in the analysis have to be identified. The cost drivers chosen are based on the definition that the costs of operating a distribution system are the costs of building and maintaining the system of service lines, mains and transformers, and of measuring and billing electricity. The variables that were utilized to come up with an appropriate cost function for Philippine ECs are drawn from the comprehensive list of cost factors enumerated by Weyman-Jones and Burns (1996). When the appropriate cost function is found, it is then used for estimating efficiency rankings for SFA.

The core output variable is specified to be total electricity delivered measured by total sales in KWh. The core input variable is identified to be total operating and maintenance expenditures, transformer capacity and length of distribution line, all of which are widely accepted in literature as required input variables. However, as pointed out by Kumbhakar and Hjalmarsson (1998), length of distribution lines, which measures the amount of capital in the form of network, has to be treated with caution because it can be misleading since it can reflect geographical dispersion of consumers rather than differences in productive efficiency. Therefore, in previous studies of relative efficiency differences, network capital was treated either as an output or as input but only after controlling for geographical dispersion. In this essay, the second position is adopted and geographical dispersion is accounted for by including environmental variables. Service area and number of actual billed customers are exogenous operating characteristic of each cooperative's environment, both of which capture consumer density which accounts for geographical dispersion. Customer density is assumed to capture the effect of demographic features, in the sense that higher values of this variable can be expected to enable a firm to deliver more output per unit of input. For similar reasons, measurement of the effect of delivering energy at different voltages required by different customers is also needed, and therefore the proportion of total energy delivered that is distributed to residential customers is included as an additional operating characteristic (Estache, Rossi and Ruzzier, 2004). Finally, system loss and maximum demand on the system as measured by peak load are included as environmental input variables to account for technological differences among cooperatives in delivering electricity.

Following the discussion above, the initial model for the DEA and SFA, as determined by the cost function, was determined to be:

Table 1. Variables in the Initial Model

Output	Inputs	Environmental Variables
1. Total Sales	1. Total Operating and Maintenance Expenditure	1. Service Area (output)
	2. Distribution Network	2. Actual Billed Customers (output)
	3. Transformer Capacity	3. Demand Structure (output)
		4. System Loss (input)
		5. Maximum Demand (input)

These variables conform to the most frequently used input and output variables in the frequency study conducted by Jamasb and Pollitt (2001). The final model is obtained after testing the statistical significance of the environmental variables. The initial specification for the core of the model is subject to theoretical considerations while environmental variables are not theoretically determined and will only be included in the final model if they are statistically significant.

B. Data

The data for all 119 cooperatives from 1990 to 2002 are obtained from the NEA database. Since service area is measured by NEA as number of municipalities and *barangays* energized, total service area that is measured in land area is derived by identifying the land area covered of each cooperatives' franchise based on the Rural Electrification Chronicle (1999) published by NEA. Land area of each municipality is then obtained from the total land area assessment by the Land Economics and Statistics Section of the Department of Environment and Natural Resources for each municipality. The total operating and maintenance expenditure is expressed in real values (1994=100) using the CPI index for Fuel, Light and Water as published by the National Statistical Coordination Board.

III. Efficiency Analysis

A. Cost Function Estimation

The total operating and maintenance cost (*TOM*) is a function of output (*S*), input factor prices (P_i), distribution length (*DL*), transformer capacity (*TC*), and exogenous variables (Z_i),

$$TOM = f(S, P_i, DL, TC, Z_i). \qquad (1)$$

In this essay, the most general functional form for electricity distribution in the Philippines is a Cobb-Douglas cost function:[2]

$$\ln TOM = \beta_0 + \beta_1 \ln S + \beta_2 \ln P_L + \beta_3 \ln P_K + \beta_4 \ln DL + \beta_5 \ln TC + u_i \qquad (2)$$

where P_L and P_K are the prices of labor and capital, respectively.[3]

The cost function specified above does not include environmental variables. Adding the environmental variables, the function is specified as follows:

$$\begin{aligned}\ln TOM = \beta_0 + \beta_1 \ln S + \beta_2 \ln P_L + \beta_3 \ln P_K + \beta_4 \ln DL + \beta_5 \ln TC \\ + \beta_6 \ln SA + \beta_7 \ln CUST + \beta_8 \ln DS + \beta_9 \ln SL + \beta_{10} \ln PL + u_i\end{aligned} \qquad (3)$$

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2 A translog production function was estimated, however, most of the coefficients turned out to be statistically insignificant.

3 P_L is obtained by dividing the actual administrative expenses over the number of employees while P_K is obtained by dividing distribution expenses over transformer capacity (Hattori, 2002).

where *SA* is service area, *CUST* is the number of actual billed customers, *DS* is the demand structure, *SL* is the system loss and *PL* is the peak load. The descriptive statistics of each variable are presented in Table 2.

Table 2. Descriptive Statistics

VARIABLE	Obs	Dimension	Mean	Std. Dev.	Minimum	Maximum
TOM	1533	100,000 pesos	269.69	206.01	4.76	1413.04
S	1533	In KWh	42931.04	50467.38	92.00	369215.00
PL	1532	100,000 pesos per employee	0.65	0.25	0.10	1.67
PK	1356	100,000 pesos per KVA	0.03	0.005	0.01	0.06
DL	1528	km.	1460.50	991.66	11.00	6424.00
TC	1357	KVA	27290.63	63153.36	750.00	1016800.00
SA	1529	sq. km.	3006.95	7125.32	104.46	76422.38
CUST	1533	customer unit	32191.78	23147.18	268.00	122088.00
DS	1533	%	0.56	0.16	0.06	3.55
SL	1532	%	0.17	0.07	-0.10	0.43
PL	1396	KW	12570.43	12463.52	82.00	90902.00

After correcting for heteroscedasticity, the following is the cost function estimated or an unbalanced panel of 119 firms using data from 1990 to 2002:

Table 3. Results of Panel Regression Using Total Cost

	Coefficient	Std. Err.	z-value
S	0.1646*	0.0087	18.9750
P_L	0.2087*	0.0071	29.2300
P_K	0.4429*	0.0082	53.8310
DL	0.4428*	0.0090	49.1170
TC	0.0718*	0.0081	8.9090
SA	0.0274*	0.0036	7.5810
CUST	0.2025*	0.0120	16.8320
DS	0.0321*	0.0084	3.8310
SL	0.0814*	0.0070	11.5520
Constant	-0.6412*	0.0662	-9.6810

NOTE: * significant at 0.01 level of significance.

All parameter estimates are statistically significant with the expected signs. Based on the cost function estimations, the functional form that SFA will assume is determined. The validity of the variables that will be used for SFA and DEA is also verified.

B. Stochastic Frontier Analysis Efficiency Estimates

Following the cost function estimation, the general functional form for the stochastic frontier among rural electric cooperatives in the Philippines is:

$$\ln TOM = \beta_0 + \beta_1 \ln S + \beta_2 \ln P_L + \beta_3 \ln P_K + \beta_4 \ln DL + \beta_5 \ln TC + \beta_6 \ln SA + \beta_7 \ln CUST + \beta_8 \ln DS + \beta_9 \ln SL + v_{it} + u_{it} \quad (4)$$

where v_{it} are independent and identically distributed random variables and u_{it} are non-negative random variables representing inefficiency. SFA efficiency scores measure the distance an electric cooperative is operating away from its cost frontier. It was found out that from 1990 to 2002, the 105 electric cooperatives are operating about 39.8 percent higher than the cost efficient frontier.

C. Data Envelopment Analysis Efficiency Estimates

More important to the regulator is to be able to provide efficiency targets for the ECs. DEA results provide values for input reduction (in the case of input-oriented DEA) that can serve as guide to regulators in setting efficiency targets. DEA also identifies relevant peers for each cooperative that can serve as performance models as well as the economies of scale of each EC. This information will be useful for the regulator benchmarking the performance of the ECs.

The outputs specified in the computation of Cost-DEA are total electricity delivered, number of customers billed, service area covered and demand structure. Transformer capacity and number of employees are identified as input variables, while P_K and P_L account for their prices, respectively.[4] On the average, the electric cooperatives in the Philippines has a technical efficiency of 0.606, implying that the cooperatives could have delivered the same output using only 60.6 percent of its inputs. In terms of cost efficiency, had the cooperatives realigned their input mix, they could have been using only 57.7 percent of their costs.[5]

D. Consistency of Results

To be able to facilitate comparison among the ranking of two benchmarking methods, the variables used have to be identical. Based on the original estimated cost function, variables were chosen to run TE-DEA and SFA. To make the frontier identical, cross-section DEA and SFA were run for the year 2001. The results are presented in Appendix 1.

Columns 3 to 6 show DEA technical efficiency scores. Increased efficiency is associated with using fewer inputs for a given level of output. The DEA technical efficiency measures provided in this study reflect the degree to which quantities of inputs are higher than are necessary to provide current quantities of outputs.

Column 3 shows the overall technical efficiency score which demonstrates the existence of inefficiency and the extent of that inefficiency. However, from a

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[4] The envelopment form of the model is generally the preferred form to solve DEA and is the one utilized by the Data Envelopment Analysis Program (DEAP) by Tim Coelli (1996). The DEAP version 2.1 is used in this study.

[5] Detailed results of the study can be accessed at a separate paper presented at the Asia-Pacific Productivity Conference 2004 (http://www.uq.edu.au/economics/appc2004/Papers/cs5C2.pdf)

manager's or regulator's perspective, the existence of inefficiency is of limited use in itself. Information is needed on the sources of that inefficiency, and the extent of inefficiency that is attributable to management. Columns 4 and 5 show the decomposition of overall technical efficiency score decomposed into two elements: (1) pure technical efficiency (column 4) relates to efficiency due to the operating environment and, in part, to controllable management and work practices; and (2) scale efficiency (column 5) indicates whether or not the distributors are operating at an optimum size. Whether the distributor is operating in a region of increasing or decreasing returns to scale is shown in Column 6.

For 2001, the pure technical efficiency score is on the average 86 percent. This score suggests that the cooperatives could probably reduce their inputs by around 14% and still be able to produce same level of output if they were to operate at a level commensurate with the best practice of other similar distributors in the sample.

The relationship between the efficiency score obtained and the age of capital was also examined to ensure that the efficiency score obtained is not biased. The age of capital of each cooperative was calculated as the average number of years from 2001 that the transformer was installed. It was found out that efficiency scores obtained from both DEA and SFA are not affected by the average age of installed transformers.

It is also worth noting that the rankings of DEA and SFA are similar when outlier cooperatives are disregarded. Since one of the drawbacks of DEA is giving an efficient score of 1 to a firm who has no peer among the cohort, by using DEA and SFA simultaneously, the outlier firms can easily be identified. From the table, cooperatives BENECO, OMECO, CENECO and FICELCO can be immediately identified as outlier firms by comparing the rankings of DEA and SFA. The DEA results indicate that these five firms have no peer among the sample and are thus merely outliers, not frontier cooperatives.

E. Benchmarking of Electric Cooperatives

The EPIRA gave mandate to the NEA to strengthen the technical capability of ECs to be able to prepare them in the deregulation of electricity market. To pursue this mandate, the NEA conducts categorization and classification assessments. Cooperatives are classified as extra large (EL), large (L), medium (M) and small (S) measured by circuit km of lines, total sales and residential connections. Categorization, on the other hand, is based on the compliance of efficiency targets by the cooperatives. Cooperatives are categorized as A+, A, B, C, D, E, depending on the points they garner regarding the following indicators: amortization payment, system loss, collection efficiency, payments of purchased power, and non power cost. Based on the results of these assessments, good performance is rewarded by upward adjustments in per diems and representation allowances of the employees of ECs while those that retrogressed have automatic downward adjustments in these benefits.

This study disaggregated the ECs according to the NEA's classification to be able to minimize the problem of outlier firms. The results will also aid NEA in specifying appropriate efficiency targets for cooperatives operating on a particular classification. The efficiency ranking for 2001 per Cooperative Classification suggests that there is possible room for reduction in total operating cost and system losses. Table 4 shows the potential decrease in input usage for the ECs which ranked lowest per classification.

Table 4. Potential Input Decrease for ECs with the Lowest DEA-VRS Scores

ECs	Actual		Target		Percentage Decrease	
	Total Expenditure	System Loss	Total Expenditure	System Loss	Total Expenditure	System Loss
CANORECO (EL)	508.9828	0.209302	356.381	0.147	-30%	-30%
SORECO2(L)	450.7169	0.273392	333.419	0.206	-26%	-25%
CASURECO4(M)	167.9289	0.214858	133.052	0.137	-21%	-36%

The DEA results make it possible to compare the inefficient unit's use of input and output compared to its peer group. For example, In the case of SORECO2, its peer group was identified to be ZAMSUR2, ZAMEC02, LEYTE4 and DORECO, all of which are producing efficiently. The DEA result reveals the when SORECO2 is compared to these four ECs, in producing the same level of output SORECO2 is using 26 percent more of total expenditure and has 25 percent more system loss.[6]

Direct translation of DEA results as efficiency targets, of course, will not be appropriate. NEA has to evaluate the DEA results together with categorization assessments to be able to come up with more holistic efficiency targets.

IV. Concluding Remarks

This essay attempts to find alternative ways of benchmarking the efficiency of electric cooperatives in the Philippines. These rankings and productivity values will prove to be useful in the recent Performance Enhancement Program of NEA for the condonation of EC debts. When used alongside the current NEA classification and categorization method, the efficiency targets will result to a more holistic and appropriate efficiency rankings and estimates. The fact that DEA and SFA are based on theoretically determined cost function will lead to results that are more representative of the ECs actual performance, rather than basing them on single ratios, which, when considered alongside other ratios will lead to results that are rather misleading.

In summary, the steps for benchmarking efficiency using DEA and SFA are: (1) identification of appropriate input and output variables, (2) estimation of cost function and determining significance of environmental variables, (3) using

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[6] Detailed peer grouping among EL, L and M cooperative classification is presented in the author's thesis titled "Essays on Electricity Regulation in the Philippines" submitted to Hitotsubashi University in 2003.

the variables determined in the cost function, estimation of SFA and DEA, and (4) determining peer groups from the DEA results.

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Appendix 1. DEA and SFA Ranking for Year 2001

COOPERATIVES	OBS NO.	CRS-DEA	VRS-DEA	SE	RTS	SFA	SFA-RANK
PELCO1	26	1	1	1	-	1.00459	1
PELCO3	27	1	1	1	-	1.00464	2
BOHECO2	64	1	1	1	-	1.00470	3
MOPRECO	7	1	1	1	-	1.00480	6
CENPELCO	9	1	1	1	-	1.00480	8
MORESCO2	86	1	1	1	-	1.00481	10
PRESCO	28	1	1	1	-	1.00482	12
DASURECO	100	1	1	1	-	1.00485	14
MAGELCO	103	1	1	1	-	1.00485	15
SOCO2	97	1	1	1	-	1.00486	18
MARELCO	35	1	1	1	-	1.00490	26
PELCO2	20	1	1	1	-	1.00491	29
ISECO	8	1	1	1	-	1.00491	30
SIARELCO	85	1	1	1	-	1.00492	34
QUEZELC2	39	1	1	1	-	1.00493	35
BILECO	76	1	1	1	-	1.00494	41
CAGELCO1	14	1	1	1	-	1.00494	44
BATALEC2	33	1	1	1	-	1.00498	61
PENELCO	21	1	1	1	-	1.00499	64
GUIMELCO	54	1	1	1	-	1.00500	70
KAELCO	12	1	1	1	-	1.00501	71
INEC	4	1	1	1	-	1.00501	72
TAWELCO	81	1	1	1	-	1.00502	75
LEYTE4	71	1	1	1	-	1.00503	78
ZAMCELCO	79	1	1	1	-	1.00506	84
FICELCO	42	1	1	1	-	1.00511	96
CENECO	55	1	1	1	-	1.00512	97
OMECO	36	1	1	1	-	1.00514	100
BENECO	5	1	1	1	-	1.00515	101
SOLECO	66	0.993	1	0.993	Drs	1.00480	7
ALECO	48	0.993	1	0.993	Drs	1.00493	36
TARELCO2	23	0.99	1	0.99	Irs	1.00485	16
IFELCO	15	0.983	1	0.983	Irs	1.00492	32
DANECO	101	0.934	1	0.934	Drs	1.00496	53

LUELCO	3	0.924	1	0.924	Drs	1.00499	67
SAMAR1	68	0.88	1	0.88	Irs	1.00494	45
CEBECO3	61	0.912	0.993	0.919	Irs	1.00492	33
ANTECO	57	0.805	0.988	0.814	drs	1.00509	91

Appendix 1. DEA and SFA Ranking for Year 2001 (continued)

COOPERATIVES	OBS NO.	CRS-DEA	VRS-DEA	SE	RTS	SFA	SFA-RANK
TARELCO1	29	0.957	0.974	0.982	drs	1.00490	28
LEYTE1	74	0.844	0.972	0.868	irs	1.00503	80
PANELCO3	6	0.962	0.965	0.997	irs	1.00494	43
ORMECO	37	0.915	0.959	0.954	drs	1.00490	27
FIBECO	90	0.922	0.927	0.994	irs	1.00484	13
ZAMECO1	30	0.885	0.922	0.96	irs	1.00493	39
ANECO	94	0.918	0.92	0.997	irs	1.00501	73
LEYTE3	72	0.899	0.919	0.978	irs	1.00495	46
LEYTE2	73	0.899	0.919	0.978	irs	1.00495	47
SURNECO	84	0.902	0.909	0.992	irs	1.00478	5
AURELCO	31	0.882	0.901	0.978	drs	1.00509	92
ISELCO3	16	0.9	0.9	1	-	1.00495	48
CEBECO1	63	0.887	0.887	0.999	irs	1.00487	21
NEECO1	18	0.882	0.887	0.994	drs	1.00496	50
CEBECO2	62	0.876	0.886	0.988	drs	1.00493	38
ZAMSUR2	78	0.86	0.886	0.971	irs	1.00487	22
SORECO1	41	0.875	0.884	0.99	drs	1.00493	40
ISELCO2	11	0.862	0.883	0.976	drs	1.00496	51
BATALEC1	32	0.835	0.881	0.948	drs	1.00510	95
QUIRELCO	13	0.858	0.874	0.981	irs	1.00507	86
PANELCO 1	2	0.826	0.861	0.96	drs	1.00481	11
NEECO3	19	0.845	0.856	0.987	irs	1.00510	94
BOHECO1	65	0.809	0.856	0.945	drs	1.00515	102
CAMELCO	91	0.73	0.856	0.853	irs	1.00505	81
CAGELCO2	10	0.779	0.852	0.914	drs	1.00500	69
QUEZELC1	38	0.786	0.849	0.926	drs	1.00499	65
ILECO1	53	0.839	0.846	0.992	drs	1.00510	93
MOELCI1	89	0.81	0.843	0.961	irs	1.00496	54
NORECO1	60	0.791	0.841	0.941	irs	1.00477	4
CASUREC3	44	0.828	0.835	0.991	drs	1.00514	99
CASUREC2	45	0.783	0.812	0.964	irs	1.00509	90
ZANECO	77	0.802	0.809	0.991	drs	1.00488	24
SURSEC1	96	0.784	0.809	0.969	irs	1.00481	9
NORECO2	59	0.799	0.808	0.989	irs	1.00496	55
SOCO1	98	0.794	0.808	0.983	irs	1.00494	42
MOELCI2	88	0.788	0.804	0.98	irs	1.00486	19
CAPELCO	56	0.79	0.799	0.989	irs	1.00502	77
SURSECO2	95	0.782	0.799	0.979	irs	1.00493	37
NOCECO	50	0.755	0.797	0.947	drs	1.00498	60
AKELCO	58	0.796	0.796	1	-	1.00497	58
LANECO	104	0.788	0.791	0.997	drs	1.00488	25
ESAMELCO	75	0.787	0.787	0.999	drs	1.00496	52
ASELCO	93	0.785	0.787	0.997	irs	1.00486	20
ZAMECO2	24	0.776	0.787	0.985	irs	1.00516	103
ABRECO	1	0.785	0.786	0.998	drs	1.00506	85

Appendix 1. DEA and SFA Ranking for Year 2001 (continued)

COOPERATIVES	OBS NO.	CRS-DEA	VRS-DEA	SE	RTS	SFA	SFA-RANK
DORECO	99	0.746	0.781	0.954	irs	1.00487	23
BUSECO	92	0.762	0.777	0.981	irs	1.00485	17
FLECO	34	0.772	0.773	0.998	irs	1.00495	49
SAJELCO	22	0.71	0.771	0.921	irs	1.00497	57
ZAMSUR1	80	0.754	0.754	1	-	1.00512	98
COTELCO	105	0.736	0.743	0.99	irs	1.00499	68
SAMELCO2	67	0.714	0.736	0.97	irs	1.00491	31
SUKELCO	102	0.721	0.73	0.987	irs	1.00496	56
BASELCO	83	0.704	0.717	0.983	irs	1.00499	62
NUVELCO	17	0.703	0.716	0.982	drs	1.00499	63
LEYTE5	70	0.706	0.71	0.993	irs	1.00497	59
NORSAMAR	69	0.691	0.708	0.977	irs	1.00508	89
MORESCO1	87	0.663	0.701	0.947	irs	1.00506	83
CASUREC4	43	0.641	0.693	0.925	irs	1.00508	88
NEECO2	25	0.661	0.688	0.961	irs	1.00501	74
CASUREC1	46	0.674	0.687	0.982	irs	1.00507	87
VRESCO	49	0.683	0.686	0.995	drs	1.00499	66
ILECO2	52	0.67	0.672	0.997	drs	1.00502	76
ILECO3	51	0.623	0.645	0.966	irs	1.00506	82
SULECO	82	0.589	0.642	0.917	irs	1.00503	79
SORECO2	40	0.585	0.591	0.989	irs	1.00528	105
CANORECO	47	0.561	0.562	0.999	-	1.00519	104
	Mean	**0.858**	**0.878**	**0.977**		**1.00496**	