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OUTPUT INCREASING EFFICIENCY IN THE NICARAGUAN MANUFACTURING SECTOR 1991-1994

by

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1. Introduction

In a small developing country like Nicaragua, the main objective for a producer is to produce as much output as possible, and to produce it as efficiently as possible Given the resources and the current production structure of Nicaragua, growth i e increased production must, at least in the short run, be the crucial economic issue It is not just a question of increased production, it is a question of increased and efficient production, efficiency being defined as greatest possible output produced when economizing with resources That is the very object of this study, in which, for the first time, the development of productive efficiency on plant (production unit, or firm) level of all industries in a country's entire manufacturing sector is analysed in depth

There are numerous studies of the efficiency or productivity change of the plants of a single industry or service sector for many countries, this study, however, provides information on the productive efficiency of the plants of all Nicaraguan industries The scarcity of this kind of studies is most certainly due to the fact that there is a considerable difference between studying one single sector in a country with ample availability of data, and studying many sectors in a country with limited data availability

While efficiency is regarded as the instantaneous picture of the relationship between resources employed (inputs) and production (output) for a certain production unit in relation to a reference (or frontier) technology, the productivity of a production unit is generally defined as the relationship between production and resources employed over time Different products are weighted into a production index and the different factors of production (inputs) are weighted into a resource index, see e g Caves, Christensen and Diewert (1982)

Commonly, productivity is often misconstrued to be the relationship between output and one specific factor of production Labour productivity is a typical example of a popular measure of this type These types of measures may , however, be highly misleading since they are partial The main weakness of partial productivity measures is that they are all

arbitrarily chosen, whithout reference to the specific, underlying model of the production process in question Consequently, they do not reflect the fact that the efficiency or productivity of all factors employed are relevant for the production For instance, the labour productivity may very well increase, e g through extensive increase in capital, such as newer and improved machinery, while at the same time, total factor productivity decreases

The main model of this study includes four inputs, labour, capital, energy and materials, together with aggregated output An auxiliary model including only labour and capital inputs together with aggregated output is also employed Methodologically, the study is based on the Data Envelopment Analysis (DEA) method, in which a hull (the socalled frontier) is constructed around the data. No production unit is located outside this hull, the fully efficient units (the frontier units) make up the frontier, while the rest of the units (the less efficient units) are inside the hull The distance from an observation to the hull constitutes the measure of the unit's productive efficiency

In this study, we measure the output increasing efficiency, i e the relationship between the actual production volume (output) and the production volume that could be obtained if the resources were employed in the most efficient way possible For the period between 1991 and 1994, efficiency comparisons are made between the different production units of each industry as well as between export and non-export firms The total efficiency of each industry is also reported.

2. Data and Model Considerations

The data have been constructed based on industry statistics obtained on location and cover the period between 1991 and 1994 (for a few production units, data regarding 1995 have been obtained, and are included in the analysis) The industry definition used is the ISIC Rev 3 four-digit level

The main model employed includes the following four input variables together with an

aggregated output variable

- Labour Average number of workers employed during the year
- Capital Book value of capital (in thousands of 1994 cordobas)
- Energy Value of expenditures on electricity, fuel and lubricants (in thousands of 1994 cordobas)
- Materials Value of materials used (in thousands of 1994 cordobas)
- Outputs Gross value of production (in thousands of 1994 cordobas)

Due to missing observations, many firms only report labour and capital figures, a second model specification, the auxiliary model, consisting of only labour, capital and output variables has been employed This is to ensure that we obtain efficiency results for as many production units as possible

Industries (ISIC numbers) 1543, 2023, 2101, 2211, 2221, 2320, 2519, 2693, 2720, 2731, 3120, 3592 and 3430 are not included in the auxiliary model estimations, and these as well as industries 1422, 1544, 1721, 1730, 2710, 2891, 2927, 3311 and 3320 are not included in the main model estimations The reason is that these industries consist of very few production units (usually, there are only one or two observations) Furthermore, in the case of the main model, the information requirement is such that an additional number of units must be omitted due to lack of information

Several of the Nicaraguan industries consist of only a few production units, and there is also inconsistent reporting for some of the units Data considerations make a socalled intertemporal frontier approach suitable in this case (the concept of intertemporal efficiency estimates was first defined and labeled by Tulkens and Vanden Eeckaut 1991) Assuming the reference production set to be invariant over time, output increasing efficiency estimation is thus made in reference to all the data for all years of observation

For a description of the estimation method used, the Data Envelopment Analysis (DEA) method see Appendix A

3 Empirical Results

This section reports the output increasing efficiency of the different production units of the Nicaraguan industries during the period between 1991 and 1994 For a few production units, data regarding 1995 have also been obtained and are included in the analysis Given the amount and combination of inputs employed, the estimated efficiency values indicate how much a unit produces as a portion of the output that were possible, if the production unit in question had been on the efficiency frontier, i e if it had been fully efficient The value of the structural measure presented for each industry should be interpreted in the same way The structural measures show the output increasing efficiency of the total industry in question

For instance, as seen in Table 1 below, the efficiency value of Unit 1 in Industry 1 equals 0 73 in 1991, which means that this unit only produces 73% of the output that would have been possible to produce had the unit been on the efficiency frontier For a fully efficient unit, the estimated efficiency equals 1

Furthermore, it should be noted that efficiency is measured in relative terms, i e the efficiency of a production unit is measured relative to the efficiency of all the other production units, subject to the restriction that all units are on or below the efficiency frontier

It should also be noted that since many industries consist of very few production units, the probability that linear combinations of some production units will dominate several other units is quite low The resulting efficiency measure in such cases will therefore equal 1 Logically, the probability that linear combinations of some units will dominate many others increases when the number of observations increases

Consequently, the structural efficiency values should be higher in the main model, since this model includes more variables and much fewer observations Generally, one may expect the structural efficiency to be higher in models that contain a greater number of inputs This is correct as long as the variables are relevant In the auxiliary (2 input)

model, inefficiency is higher than in the main (4 input) model To a certain extent this is explained bv the fact that the 2 input model does not include all relevant variables A greater number of variables may provide a closer fit to the data As for the importance of the number of observations, the fewer the observations, the fewer the linear combinations of these which may build a frontier (i e dominate others) The greater number of inputs together with fewer observations is one reason why the efficiency values of the 4 input model should be higher

Moreover, the individual efficiency values are also affected by missing observations which imply that relevant reference (frontier) units may no longer exist, thus individual efficiency values of the units that actually should be dominated by the now missing units will be overestimated An illustration of this fact is Unit no 635 in Industry no 79 In the main model, Unit no 635 is the only unit observed In accordance with the auxiliary model results, the efficiency of the unit decreases during year 2 (1992), but when Unit no 636, that obviously dominates this unit, is missing from the comparison, Unit 635 gets an efficiency value equal to 1 (as compared to 0 32 in the auxiliary model)

All estimated efficiency values are presented in Appendix B A selection of efficiency results for certain industries is , however, also presented below In every case where there is a relatively large number of observations, the main model should be regarded as the most relevant model specification When there are relatively many missing observations in the main model, the auxiliary model specification is used to provide guidance Throughout this section, the results of the main model (when applicable) are found in tables labelled "Table 1" and the results of the auxiliary model are presented in the relevant "Table 2" For industries with very few observed units, conclusions regarding efficiency are often hard or impossible to reach The results for these industries are found in Appendix B (It should be noted that in Appendix B the production unit numbers are prefixed by the numbers 2 - 5, 2 indicating year 2 (1992), 3 indicating year 3 (1993) etc Year 1 (1991) carries no prefix or the prefix 1 or 11)

Industry 1 ISIC 140 'ACTIVIDADES DE SERVICIOS AGRICOLAS Y GANADEROS EXC

Table Main Model Estimated efficiency by production unit

	Export	EFFICIENCY			
		1991	1992	1993	1994
	YES	0 73	0 82		
[illegible]	NO			1	0 07
[illegible]	YES		1		
4	YES		1	0 59	0 41
105	NO	0 71			
106	NO		0 40	0 13	
107	NO	0 44	0 49		
108	NO	0 33			
109	NO	0 19	0 33	0 46	
112	NO	0 71	1	1	
113	NO	0 11			
114	NO	0 13	0 33	0 06	
115	NO	0 30	0 42		
116	NO	0 33			
117	NO		0 52		
118	NO	1			
120	NO		0 53		
121	NO		0 07		
122	NO		0 69	0 79	
123	NO		0 11		
124	NO		0 37	0 19	
[illegible]	NO		0 24	0 35	0 31
[illegible]	NO		1		
[illegible]	NO		0 62		0 33
[illegible]	NO		0 42	0 23	
[illegible]	NO		0 08		
[illegible]	NO		0 07	0 09	

[illegible]	Export	1991	1992	1993	1994
	NO		0 09		
[illegible]	NO			0 27	
[illegible]	NO			1	
[illegible]	NO			0 68	
135	NO			0 06	
641	NO		0 05		
717	NO				1

Total Industry 0 70

Table 1 Main Model Estimated efficiency, by production unit (cont)

Table 1 presents the efficiency values estimated by means of the main model, ie the model including four inputs and aggregated output The efficiency values of the few export units appear to be relatively high, although the efficiency of Unit No 4 is decreasing rapidly over the last two years It should, however, be noted that the above results are not enough to draw any conclusion regarding the efficiency of export and non-export firms To try to obtain a more stable basis for a comparison between export and non-export production units, we will continue the comparison of export and non-export firms in the tables below

As mentioned above, although the main model does provide the most accurate description of the production process, an "auxiliary model" including only labour and capital inputs has also been employed due to the data limitations Generally, the number of observations is larger in this model Throughout this report, Table 1 of each industry will provide the results of the main model and Table 2, the corresponding results of the auxiliary model (All estimated efficiency values are also listed in Appendix B)

Although there are relatively many observations available for Industry 1, the results of the auxiliary model are presented in Table 2 below to illustrate the theoretical discussion above pertaining to characteristic differences between the model specifications

Table 2 Auxiliarv Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
1	YES	0 73	0 82	0 77	
2	NO,1991= YES	0 16	0 06	0 17	0 05
3	YES		1		
4	YES		1	0 59	0 29
5	YES			0 16	0 30
105	NO	0 68			
106	NO	0 04	0 10	0 09	
107	NO	0 44	0 47		
108	NO	0 29		0 06	
109	NO	0 09	0 11	0 10	0 16
110	NO	0 08			
111	NO	0 18			
112	NO	0 71	1	0 05	
113	NO	0 10			
114	NO	0 10	0 14	0 03	
115	NO,1994= YES	0 27	0.35		1
116	NO	0 33			
117	NO	0 03	0 08		
118	NO	0 07			0 02
119	NO	0 21	1	0 11	
120	NO		0 15		
121	NO		0 06		
122	NO		0 38	0 30	
123	NO		0 02		
124	NO		0 11	0 06	
125	NO		0 11	0 05	0 06
126	NO		0 01	0 10	
127	NO		0 01		0 07
128	NO		0 09	0 12	

Unit No	Export	1991	1992	1993	1994
129	NO		0 02		
130	NO		0 04	0 04	
131	NO		0 07		0 19
132	NO			0 10	
133	NO			0 09	
134	NO			0 11	
135	NO			0 01	
136	NO			0 13	
137	NO			1	
138	NO			0 03	
641	NO		0 03		
717	NO				0 47

Total Industry 0 63

Table 2 Auxiliary Model Estimated efficiency, by production unit (cont)

Compared to many of the other Nicaraguan industries, Industry 1 includes relatively many observations on individual plants, a fact which improves the interpretation and the comparability of the efficiency results. With regard to individual efficiency, we naturally find differences when the estimated efficiency relates to the use of only labour and capital as compared to the use of all four inputs, i e labour, capital, materials and energy For instance, for the first two years, the efficiency values of Unit 112 are identical in both models but, there is a marked decrease during 1993 when labour and capital are regarded as the only inputs used When, on the other hand, the use of all four inputs are taken into account, the unit remains efficient

As expected, the values of the main model are generally slightly higher, and consequently, the structural or total industry efficiency amounts to approximately 70% as compared to approximately 63% in the auxiliary model Since in this case there is a relatively large number of observations and the main model is considered to be the most accurate model of the production process, this indicates that Industry 1 produces 70%

of the output that would be possible to produce with the same amount and combination of inputs had the production been fully efficient

Industry 3 ISIC 1422 "EXTRACCION DE SAL"

For the main model, there are only two observations and no estimations have been performed based on this specification For the auxiliary model, the only observed production unit, Unit no 139 has been studied during 1991, 1993 and 1994 The resulting efficiency measure equals 1 for all three years (see Appendix B) This illustrates the case that when there are very few observations, the probability that some observations will dominate others is low

Industry 5 ISIC 1511 "PRODUCCION, PROCESAMIENTO Y CONSERVAS DE LA CARNE"

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
6	YES, 1993=NO	1	1	0 78	0 81
7	YES, 1991=NO	1	1	0 95	1
8	YES	1	1		1
9	YES		1	0 99	0 90
140	NO	1	0 90		0 94
141	NO 1994=YES		0 80		0 83
142	NO		1		
143	NO		0 81		
145	NO			1	0 005

Total Industry 0 95

Generally, the efficiency of Industry 5 appears to be high An interesting unit is Unit no 145 which in 1993 is a frontier unit, but in which, in 1994 the efficiency has fallen sharply The marked efficiency reduction between 1993 and 1994 of Unit 145 is also confirmed in the auxiliary, two input, model A probable reason for this variation is incorrect data, but it would be most interesting to be able to obtain more information regarding this unit When efficiency is based on only two inputs, we generally find that the values are much lower In particular, Units, 6, 7 and 142 perform much better when the output increasing efficiency reflects the use of all four inputs

Industry 6: ISIC 1512 "ELABORACION Y CONSERVA DE PESCADO Y PRODUCTOS DE PESCADO"

In the main model, the efficiency values of eight of the nine observations equal 1 (see Appendix B), and we have a case similar to that of Industry 3, i e not enough observations to establish clear dominance. The results of the auxiliary model are presented in Table 2 below

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency				
		1991	1992	1993	1994	1995
10	YES	0.52	0 61			
11	YES		1	1	1	
12	YES			1	0 44	
146	NO		0 07			
147	NO, 1994 = YES			1	0 27	
148	NO			0 08		
645	YES		0 48	0 17		1
714	YES				0 94	
716	YES				1	

Total Industry 0 83

Industry 7 ISIC 1513 "ELABORACION Y CONSERVACION DE FRUTAS Y LEGUMBRES"

In both models the only unit included is Unit no 13 The models imply that the unit's efficiency is increasing during the last years, see Appendix B

Industry 8 ISIC 1514 "ELABORACION DE ACEITE Y GRASAS DE ORIGEN VEGETAL"

As seen in Tables 1 and 2 below, information is only available for 1991-1993 and the industry consists of few production units

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency		
		1991	1992	1993
14	YES, 1992=NO	1		1
15	YES	1	0 84	0 91
16	YES	1	0 98	1

Total Industry 0 97

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency		
		1991	1992	1993
14	YES, 1992=NO	1	1	1
15	YES	0 71	0 69	0 72
16	YES	1	0 85	1

Total Industry 0 88

Both tables imply that the efficiency of Units 15 and 16 was slightly lower in 1992 as compared to 1991 and 1993 (The industry has been included in this, more detailed presentation section as an example of the possibility of finding indications of dominance in sectors with relatively few observations, here 8 and 9, respectively)

Industry 9· ISIC 1520 "ELABORACION DE PRODUCTOS LACTEOS"

The main model includes 9 observations, 7 of which equal 1 Efficiency values not equal to 1 are estimated for Unit no 17 (0 88) in 1991 and for Unit no 149 (0 63) in 1994 (see Appendix B) The auxiliary model includes 16 observations and the results are presented in Table 2 below The Units 149 and 642 are fully efficient according to both models, and in 1992, Unit 17 is also found to be efficient by both models As before, the efficiency of the observed export firms (Units 17 and 642) is relatively high

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency				
		1991	1992	1993	1994	1995
17	YES	0 84	1			
149	NO	1			0 47	
150	NO	0 47				
151	NO		0 08			
152	NO			0 17	0 13	
153	NO			1		
154	NO			0 06		
642	NO, 1995 = YES		0 60	0 61	1	1
646	NO				1	
647	NO				0 48	

Total industry 0 83

Industry 10: ISIC 1531 "ELABORACION DE PRODUCTOS DE MOLINERIAS"

The main model for Industry 10 includes 29 observations The structural measure indicates that the total efficiency of the industry amounts to approximately 81 per cent There is not sufficient information to support conclusions regarding the efficiency of the industry's export and non-export units

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
18	YES	0 69	0 71		
19	NO, 1992=YES	0 79	1	1	0 81
20	YES	1	1		1
21	NO, 1992=YES	0 58	0 28		0 73
22	NO, 1991=YES	0.38	0.22	0.31	0 65
157	NO	1		0.33	
158	NO	0 43	0 45	0.56	0 76
159	NO		0.55	0 16	
160	NO		1	1	1
163	NO			0 78	
715	NO				1

Total Industry 0 81

Industry 11· ISIC 1533 "ELABORACION DE ALIMENTOS PREPARADOS PARA ANIMALES"

The main model for Industry 11 includes 10 observations, 8 of which equal 1 These 8 units are also found to be efficient according to the auxiliary model, see Appendix B The structural measure of both models indicate that the total efficiency of the industry

is high (0 97 and 0 93) All production units are non-export firms

Industry 12: ISIC 1541 "ELABORACION DE PRODUCTOS DE PANADERIAS"

The auxiliary model pertaining to Industry 12 includes 227 observations, while the main model includes 23 observations As can be seen in Appendix B, many of the frontier units of the main model are also efficient according to the auxiliary model This also applies to the only export unit, Unit no 23, which is found to be efficient according to both models (It should be noted that for 1992, the production unit numbers of the auxiliary model are prefixed by the number 22)

Industry 13: ISIC 1542 "ELABORACION DE AZUCAR"

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency				
		1991	1992	1993	1994	1995
24	YES	1	1			
25	1991,1992=NO, 1993-1995=YES	0 76	0 82	1	1	1
26	YES	1	1	0 94		
302	NO	1				
303	NO	0 94				
304	NO	1				
305	NO		1			
643	YES				1	

Total Industry 0 97

Industry 13 includes 15 observations There is not sufficient information to support conclusions regarding differences between the efficiency of the industry's export and non-

exc r units

ndustry 5 ISIC 1544 'ELABORACION DE MACARRONES FIDEOS Y ALCAZCAS'

For the main model, there is only one observation and no estimations have been performed based on this specification The auxiliary model includes 4 observations, see Appendix B These figures may simply be interpreted as the efficiency of Unit 308 having decreased during 1994

Industry 16 ISIC 1549 "ELABORACION DE OTROS PRODUCTOS ALIMENTACION N C P

There are 14 observations in the main model, 10 of which equal 1 The auxiliary model includes 36 observations No export units are reported in either model

The results of the auxiliary model are presented in Table 2 below

Production unit no 312 is fully efficient during the first (1991) and the last year (1994) of study according to both models Unit no 318 is also operating efficiently according to both models Although the values of some of the other units in this case may be overestimated in the main model (due to the small number of observations), it should be kept in mind that the auxiliary model is based on only two inputs and, consequently, does not provide a complete picture of the production process

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
310	NO	0 48	0 45	0 46	
311	NO	0 20		0 76	0 17
312	NO	1	0 89	0 73	1
313	NO	0 18			
314	NO	0 31			
315	NO	0 47			
316	NO	1			
317	NO	0 37	0 26	0 15	
318	NO	1	1		1
319	NO		0 26	1	
320	NO		0 14	1	1
321	NO			0 23	
322	NO			0 50	
323	NO			1	1
324	NO			1	
325	NO		0 12	0 23	
326	NO		0 14	0 63	
327	NO			1	
328	NO			0 50	

Total Industry 0 86

Industry 17 ISIC 1551 "DESTILAC Y RETRIFIC Y MESCLA DE BEBIDAS ALCOHOLICOS"

For Industry 17, 10 observations are included in both models, and the same units appear as frontier (i e fully efficient) units in both models This fact implies that these results are relatively stable although the number of observations is rather small

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency		
		1991	1992	1993
27	NO, 1991 = YES	0 54	0 97	0 64
28	YES	1	0 86	1
329	NO	0 90	1	0 60
330	NO	1		

Total Industry 0 90

Industry 19: ISIC 1553 "ELABORACION DE BEBIDAS MALTEADAS Y DE MALTA"

For both models there are too few observations (4) to provide reliable estimates, see Appendix B

Industry 20: ISIC 1554 "ELABORACION DE BEBIDAS NO ALCOHOLICOS PROD DE AGUAS"

In the main model, the efficiency estimates of all seven observations equal 1 The auxiliary model includes 10 observations Both models indicate that Unit no 31 is efficient, see Appendix B

Industry 21 ISIC 1600 "ELABORACION DE PRODUCTOS DE TABACO"

For Industry 21, 8 observations are included in both models, and for 1991 Units 32, 33 and 336 appear as frontier (i e fully efficient) units in both models, while the same applies to Unit no 644 in 1994, see Appendix B This fact implies that these results are

relatively stable although the number of observations is small

Industry 22. ISIC 1711 "PREPARACION E HILATURA DE FIBRAS TEXTILES, TEJADUR"

There are four observations available for Industry 22, see Appendix B Both models do, however, indicate relatively low efficiency for Unit no 35 in 1991

Industry 23: ISIC 1721 "FAB DE ART CONFECCIONADOS DE MATER TEXTILES"

For the main model, there are two observations and no estimations have been performed based on this specification. The auxiliary model does, however, indicate the presence of domination, see Appendix B

Industry 24: ISIC 1723 "FAB DE CUERDAS, CORDELES, BRAMANTES Y REDES"

In the main model, the only observed production unit, Unit no 37, has been studied between 1991 and 1994 The resulting efficiency estimates equal 1 for all years The auxiliary model includes six observations, see Appendix B

Industry 25: ISIC 1729 "FAB DE OTROS PRODUCTOS TEXTILES (N C P)"

Except for in 1994, Unit no 38 is the only production unit observed in Industry 25, see Appendix B Unit no 719, which is only observed in 1994 obtains an efficiency value equal to 1 according to both models There are six observations included in the models

Industry 26 ISIC 1730 'FABRICACION DE TEJIDOS Y ARTICULOS DE PUNTO'

F - -e main model, there is only one observation, and no estimations have been performed based on this specification An indication of dominance is found when app ing the auxiliary model specification These estimations are based on five observations see Appendix B

Industry 27 ISIC 1810 'FABRICACION DE PRENDAS DE VESTIR"

The main model pertaining to Industry 27 includes 10 observations while the auxiliary model includes 55 observations As can be seen in Appendix B, two of the frontier units of the main model (Unit no 348 in 1991 and Unit no 345 in 1992) are found to be efficient according to both models According to the auxiliary model, where only capital and labour inputs are taken into account, the structural efficiency of Industry 27 is approximately 60%

Industry 29· ISIC 1911 "CURTIDO Y ABODO DE CUERO"

In the main model, the efficiency of eight of the eleven observations equal 1 (see Appendix B), i e there are not enough observations to establish clear dominance Consequently, we also make use of the 2 input model specification, and the results of the auxiliary model are presented in Table 2 below

The four export firms, Units 40, 41, 42 and 43 are all efficient during 1991 This is also confirmed by the main model estimations Furthermore, Unit no 41 is also estimated to be efficient by both models in 1993, while Unit no 43 is efficient in 1995 according to both models

Industry 29 (cont)

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency				
		1991	1992	1993	1994	1995
40	YES	1			0 59	
41	YES	1	0 63	1	0 44	
42	YES	1	0 45			
43	YES	1				1
378	NO	0 17	0 01	0 03		
379	NO	0 15	0 23			
380	NO		1		0 39	
381	NO		0 11	1		
382	NO		0 67			
383	NO		0 16			
384	NO		0 34			
385	NO		0 21	0 67		
386	NO			0 51		
387	NO		1	0 93		
388	NO		0 29	0 11		
389	NO		0 13			
390	NO			0 88		
391	NO			0 21		
392	NO			0 45		
682	NO				0 60	

Total Industry 0 83

Industry 30· ISIC 1912 'FABRIC DE MALETAS, BOLSOS DE MANO Y ARTOS SIMILARES'

In the main model, the efficiency of the only production units observed, Units 45 and 46 appears to decrease during 1994 With respect to Unit no 46 the findings are confirmed by the auxiliary model, which for Industry 30 includes 21 observations

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
45	YES	0 16	0 59		0 65
46	NO	0 85		1	0 83
47	NO			0.32	1
393	NO		0 63	0.58	
394	NO		0 10	0 60	
395	NO		0 33	1	
396	NO		0 21	0 13	
397	NO		1		
398	NO		0 67	1	
399	NO			0 34	
400	NO			0 40	

Total Industry 0 78

Industry 31 ISIC 1920 "FABRICACION DE CALZADO"

There are six efficient observations according to the main model With the exception of Unit no 51 in 1994, the high efficiency of the corresponding units is confirmed by the auxiliary model For Industry 31, there are no clear indications of potential efficiency differences between export and non-export production units

Industry 31 (cont)

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
48	YES	1	1	0 86	
49	YES	0 69			
50	1991 = YES, 1992 = NO	0 81	0 65		
51	NO, 1991 = YES	0 85	1		1
401	NO	1			
402	NO	1			

Total Industry 0 90

Industry 32: ISIC 2010 "ACERRADO Y ACEPILLADURA DE MADERA"

In the main model, the estimated efficiency of nine of the ten observations equals 1, see Appendix B The high efficiency of Units 52 and 417 in 1991 is, however, confirmed by the auxiliary model As seen in Table 2 below, information was only obtained for the period 1991-1993.

Based on Table 2, no clear indications of efficiency differences between export and non-export production units can be identified

Industry 32 (cont)

Table 2 Auxiliary Model Estimated efficiency by production unit

Unit No	Export	Efficiency		
		1991	1992	1993
52	NO, 1991 = YES	1	0 87	1
53	YES		0 80	0 40
54	YES		0 29	0 30
415	NO	0 62		
416	NO	0 17	0 28	0 13
417	NO	1	0 41	
418	NO		0 81	
419	NO		0 70	
420	NO			1
421	NO			0 22
422	NO			1
423	NO			0 10

Total Industry 0 75

Industry 33: ISIC 2022 "FABRIC DE PARTES Y PIEZAS DE CARPINTERIA P/EDIFIC"

For Industry 33, the information required by the main model was only obtained for 1991, and the efficiency of four of the five units observed equals 1 (see Appendix B) Units 57 and 424 are, however, also found to be efficient according to the auxiliary model The auxiliary model includes 13 observations (It should be noted that most production units are observed once see Appendix B)

Industry 35 **ISIC 2029** "FABRICACION OTROS DE PRODUCTOS DE MADERA, CORCHO Y PAJA"

In the main model there are not enough observations to establish clear dominance, and the efficiency of six of the seven observations equal 1 The auxiliary model includes 12 observations During 1991, Units 434 and 435 are found to be efficient according to both models, and the same is also true for Unit no 435 in 1992, see Appendix B

Industry 37. ISIC 2102 "FABRICACION DE PAPEL Y CARTON ONDULADO Y DE ENVASE"

There are seven observations available for Industry 37, see Appendix B To a great extent, the values of both models coincide

Industry 38: ISIC 2109 "FABRICACION DE OTROS ARTICULOS DE PAPEL Y CARTON"

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
59	YES	0 66	0 72		
442	NO	1			
443	NO	1	1		
444	NO	0 71	0 66	1	0 65
445	NO	0 60			
446	NO		0 07	1	
447	NO		0 29	0 27	
448	NO			0 19	

Total Industry 0 88

In the main model, the efficiency of eight of the nine observations equal 1 and consequently, we make use of the 2 input model specification The results of the auxiliary model are presented in Table 2 above Both models indicate that the following observations are fully efficient Units 442 and 443 in 1991, Unit no 443 in 1992 and Unit no 444 in 1993

Industry 40 ISIC 2212 "EDICION DE PERIODICOS, REVISTA Y PUBLICACION DE PERIODICOS"

For Industry 40, the main model includes eight observations (the estimated efficiency values of which all equal 1) and the auxiliary model ten Unit no 60 is estimated to be efficient in 1991 and 1992 by both models, while the same applies to Unit no 451 in 1991 and to Unit no 450 in 1992, see Appendix B

Industry 41: ISIC 2219 "OTRAS ACTIVIDADES DE GRAVACION"

In the main model for Industry 41, the estimated values of all seven observations equal 1, see Appendix B The auxiliary model includes 24 observations, and the corresponding estimates are presented in Table 2 below All observations are non-export production units

It should be noted that the observations cover the period between 1991 and 1993 No data were available for 1994

Industry 41 (cont)

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency		
		1991	1992	1993
453	NO	0 47		
454	NO	0 94		0 59
455	NO	0 23	0 39	0.38
456	NO	0 45		0.33
457	NO	1		
458	NO	0 20	0 26	
459	NO		1	0 16
460	NO		0 45	1
461	NO			0 40
462	NO			1
463	NO			1
464	NO			1
465	NO			0 43
466	NO			0 47
467	NO		0.30	
468	NO			0 29
469	NO			0.39

Total Industry 0 63

Industry 44: ISIC 2411 "FABRICACION DE SUST QUIMICAS BASICAS, EXCEPTO ABONOS"

There are four observations available for Industry 44, and the only observed production unit, Unit no 62, has been studied between 1991 and 1994 Both models indicate that the efficiency of Unit no 62 was lower in 1992 than during the other years of study, see

Appendix B

Industry 46 ISIC 2421 'FABRICACION DE PLAGICIDAS Y OTROS PDTOS QUIMICOS"

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
63	YES	0 74	0 74	0 74	1
64	YES	0 78			
65	YES	0 42	0 59		
471	NO	1			1
472	NO	1			
473	NO	0 84		1	1
474	NO	1			
475	NO	1			
476	NO	0 70			1
477	NO		0 49		

Total Industry 0 87

According to the observations included in Table 1 above, the most efficient production units are non-export units There are, however, not enough observations to reach any definite conclusions to that effect

Industry 47 ISIC 2422 "FABRICACION DE PINTURAS, BARNICES Y PDTOS DE REVESTIM"

For Industry 47, there are four observations available, see Appendix B

Industry 48: ISIC 2423 "FABRICACION DE PDTOS FARMACEUTICOS, SUSTANC QUIMICAS"

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
67	YES	1	0 59		
68	YES		1	0 86	
479	NO	1			1
480	NO	0 99	1		
481	NO	0 94	1		
482	NO	0 87	1	0.88	
483	NO	1	0 82		
484	NO	1			

Total Industry 0 92

Of the eight production units observed in Industry 48, two units are export firms Although the estimated efficiency of these equals 1 for 1991 and 1992, the number of observations is not sufficiently large to enable us to make any conslusions regarding potential efficiency differences between export and non-export firms The table implies high efficiency for non-export as well as for export units

Industry 49· ISIC 2424 "FABRICACION DE JABONES Y DETERGENTES, PREPARADOS P/LIM"

As illustrated by Table 1 below, Unit no 74 is clearly a highly efficient production unit Since Unit no 71 did not cease to operate, the marked efficiency decrease is either due to incorrect data, or to an extremely serious disruption of the production process

Industry 49 (cont)

Table Main Model Estimated efficiency by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
69	1991 = NO, 1992 = YES	1	0 45		
70	YES	1			
71	NO 1992 = YES	1	0 08		
72	YES	1	0 71		
73	YES	0 86			
74	NO, 1993 = YES	0 99	1	1	1
485	NO	1			
486	NO	1			
487	NO	1			
488	NO	0 35	0 91	0 92	0 75
489	NO	1	1		0 97
490	NO	0 97			
491	NO				1

Total Industry 0 95

Industry 50: ISIC 2429 "FABRICACION DE OTROS PRODUCTOS QUIMICOS N E P"

The main model of Industry 50 includes four observations, while the auxiliary model includes seven, see Appendix B

Industry 51: ISIC 2511 "FABRICACION DE CUBIERTAS Y CAMARAS DE HULE CHO Y DE RENO"

In the main model, there are too few observations (6) to establish dominance, and the resulting efficiency estimates all equal 1 The auxiliary model includes 11 observations, see Appendix B

Industry 53 ISIC 2520 "FABRICACION DE PRODUCTOS DE PLASTICOS"

Industry 53 includes 14 observations for the main model and 16 for the auxiliary model, see Appendix B In 1991, Units 80 and 501 are frontier, i e efficient, units according to both models In 1992, Unit no 81 is also efficient according to both models

Industry 54: ISIC 2610 "FABRICACION DE VIDRIO Y PRODUCTOS DE VIDRIO"

In the main model, the estimations equal 1 for all five observations The auxiliary model includes 12 observations, see Appendix B

Industry 55: ISIC 2691 "FABRICACION DE PRODUCTOS DE CERAMICA NO REFRACTARIA P/USO"

For Industry 55, both models include four observations which is not sufficient to establish dominance, and all estimates equal 1, see Appendix B

Industry 57 ISIC 2694 FABRICACION DE CEMENTO, CAL Y YESO"

In both models, the only production unit included is Unit no 84, see Appendix B

Industry 58: ISIC 2695 'FABRICACION DE ARTICULOS DE HORMIGON, CEMENTO Y YESO"

The main model pertaining to Industry 58 includes 18 observations while the auxiliary model includes 63 observations The high efficiency of Units 86 and 508 in 1991, and of Unit no 513 in 1992 and 1993 is confirmed by the auxiliary model The auxiliary model also confirms the reduced efficiency of Unit 513 in 1994, see Appendix B

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
86	NO, 1992=YES	1	0 63	0 79	0 94
508	NO	1	0 97	1	0 86
509	NO	0 44	0 64		
510	NO	0 79			
511	NO	1			
512	NO	1			
513	NO		1	1	0 40
514	NO		1	1	

Total Industry 0 84

Industry 60: ISIC 2699 "FABRICACION DE OTROS PRODUCTOS MINERALES NO METALICOS"

For Industry 60, both models include three observations of Unit no 87, and all estimates equal 1, see Appendix B

Industry 61: ISIC 2710 "INDUSTRIA BASICA DEL HIERRO Y ACERO"

Due to the small number of observations (3), no estimations have been performed based on the main model specification An indication of dominance is found when applying the auxiliary model, but it should be kept in mind that this specification includes six observations, see Appendix B

Industry 64: ISIC 2811 "FABRICACION DE PRODUCTOS METALICOS PARA USO ESTRUC"

For Industry 64, 19 observations are included in both models In 1991, both models identify Units 90, 91, 539 as being efficient, while Unit no 89 is efficient in 1992 Units 539, 541 and 542 are frontier production units in 1994 according to both models High efficiency values are found for export as well as for non-export units As mentioned above, the main model provides the most accurate description of the production process, and the corresponding efficiency estimates are presented in Table 1 below

Table 1 Main Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
89	YES, 1994=NO	1	1		1
90	YES	1	1		
91	YES	1	0 89		0 70
538	NO	0.54	0 91		
539	NO	1	1	1	1
540	NO		1		
541	NO			1	1
542	NO, 1994=YES			0.37	1

Total Industry 0 93

Industry 65 ISIC 2891 "FORJA PRENSADO Y ESTAMPADO"

For the main model there are only two observations and no estimations have been performed based on this specification The auxiliary model includes four observations and is not enough to establish dominance, see Appendix B

Industry 66· ISIC 2893 "FABRICACION DE ARTOS DE CUCHILLERIA, HERRAMIENTAS DE MANO"

In the main model, seven of the eight observations equal 1 Consequently, we also make use of the 2 input model specification, and the results are presented in Table 2 below

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
92	YES	0 76	0 89		
93	YES, 1994=NO	1	0 82		1
545	NO	0 39	0 61	0 38	
546	NO		0 40		
547	NO		1		
548	NO		0 27		
549	NO		0 70	0 86	0 57
550	NO			1	
551	NO			0 24	

Total Industry 0 88

Table 2 illustrates that high efficiency values are found for export as well as for non-export units The lowest values are found among non-export units, but there is not sufficient information available to reach any general conclusions regarding efficiency

differences between export and non-export firms

Industry 67 ISIC 2899 "FABRICACION DE OTROS PRODUCTOS ELABORADOS DE METAL"

The estimated efficiency of six of the seven observations in the main model equals 1 Also in this case we will make use of the auxiliary model, and the corresponding results are presented in Table 2

Table 2 Auxiliary Model Estimated efficiency, by production unit

Unit No	Export	Efficiency			
		1991	1992	1993	1994
94	YES	1	0 40	0 93	
552	NO	1			
553	NO	1	0 93	0 28	1
554	NO	1	0 89		
555	NO	0 16		0 14	0 20
556	NO		0 14	0 12	
557	NO		0 08	0 08	1
558	NO			0 08	

Total Industry 0 85

The figures corresponding to Unit no 557 should be interpreted with care There are two possibilities either the production process has been substantially improved, or this is simply a case of incorrect data reporting

Industry 68· ISIC 2919 "FABRICACION DE OTROS TIPOS DE MAQUINARIA DE USO GENERAL"

In the main model, the only observed production unit, Unit no 95, has been studied between 1991 and 1994 The resulting efficiency estimates equal 1 for all years The auxiliary model includes the same observations, see Appendix B

Industry 69· ISIC 2921 "FABRICACION DE MAQUINARIA AGROPECUARIA Y FORESTAL"

In the main model, the efficiency of four of the five observations equals 1 As can be seen in Appendix B, the same four observations are found to be efficient according to the auxiliary model The auxiliary model includes 10 observations

Industry 70: ISIC 2927 "FABRICACION DE ARMAS Y MUNICIONES"

For the main model there are no observations available The auxiliary model includes seven observations, see Appendix B

Industry 73: ISIC 3140 "FABRICACION DE ACUMULADORES Y DE PILAS Y BATERIAS"

In the main model for Industry 73, six of the nine observations equal 1 In 1994, Units 98 and 100 are frontier units according to both models, see Appendix B

Industry 74 ISIC 3311 "FABRICACION DE EQUIPO MEDICO Y QUIRURGICO"

There is only one observation available for the main model, and no estimations have

been performed based on this model specification In the auxiliary model, the estimated values of all four observations equal 1, see Appendix B

Industry 75· ISIC 3320 "FABRICACION DE INSTRUMENTOS DE OPTICA"

For the main model, there are only two observations, and no estimations have been performed based on this specification An indication of dominance is found when applying the auxiliary model specification These estimates are based on five observations, see Appendix B

Industry 78: ISIC 3610 "FABRICACION DE MUEBLES"

The main model pertaining to Industry 78 includes 9 observations while the auxiliary model includes 108 observations For the main model, there are no observations for 1993 and only one observation for 1994 As can be seen in Appendix B, one of the frontier units of the main model (Unit no 102 in 1991) is a frontier unit in the auxiliary model According to the auxiliary model, where only capital and labour inputs are taken into account, the structural efficiency of Industry 78 is approximately 68%

Industry 79: ISIC 3693 "FABRICACION DE ARTICULOS DE DEPORTES"

In the main model, the only observed production unit, Unit no 635, has been studied between 1991 and 1994 With the exception of 1992, all estimates equal 1 The auxiliary model includes five observations, see Appendix B

Industry 80· ISIC 3699 "OTRAS INDUSTRIAS MANUFACTURERAS N C P"

For Industry 80, five observations are included in the main model and 14 in the auxiliary

model The estimated values of the main model are almost identical to those of the aux model see Appendix B

4 Concluding Remarks

As mentioned in the Introduction, this is the first time that the efficiency of individual production units of all industries in a country's entire manufacturing sector is studied There are numerous studies of efficiency and productivity change on plant level for many countries These studies do, however, only consider single industries Naturally, there is a considerable difference between studying one single sector in a country with ample availability of data, and studying many sectors in a country with limited data availability

Data restrictions probably constitute the most important reason why previous country studies are of a mainly descriptive nature A recent (December 1993) report by Marlon Yong Ch on Costa Rica is a typical example of such a study For eight different industries during the period between 1986 and 1992, the report provides thorough information on the development of production, export, import, labour force, competition and labour productivity In another study (July 1994), also pertaining to Costa Rica, Carl Bro International a/s gives a similar description of the country's small industry

Though data limitations naturally were present also in this case, there has, nevertheless, been possible to obtain sufficient information to provide a stable basis for efficiency estimates for many of the Nicaraguan production units and industries The analysis comprises results that have been obtained not only on industry level, but also on individual plant or production unit level

An interesting question is whether there is any significant difference between the efficiency of export and non-export production units The study implies that, for some industries the efficiency of the export firms appears to be higher than the efficiency of the non export firms There is, however, not sufficient information available to reach any definite conclusions to this effect In fact the number of export units is too small to allow

-ly testing

-u nough non-parametric models are much less restrictive than parametric models (which -ormally require more observations to satisfy the statistical properties) when it comes o data requirements, this fact should not be overexploited It is not possible to obtain meaningful estimates completely regardless of the number of observations, and a most noteworthy conclusion of this study is the importance of "good" data To enhance the knowledge of an industry's performance, data quality in terms of consistent and complete reporting for every production unit, is of crucial importance It must be possible to continually trace an individual production unit over time

A natural and most interesting continuation of this study would be to increase the number of observations by obtaining data on similar industries in neighbouring countries This would not only provide a possibility to obtain results for many of the Nicaraguan industries where we now have been unable to carry out complete analyses, but it would also provide an even more solid basis for conclusions and deductions Naturally, the process would also automatically generate comparison possibilities with the other countries in question

APPENDIX A

METHOD

1.1 Data Envelopment Analysis and Efficiency Measures

Data Envelopment Analysis is a non-parametric method to calculate the efficiency of individual production units The advantage of non-parametric methods is that there is no need to make any assumptions regarding the functional form of the underlying production function These types of assumptions invariably affect the results In DEA, a convex hull is constructed instead of an explicit frontier production function This hull constitutes the production possibility set and is solely based on the actual observations of the different production units of a specific sector or industry The hull is defined by areas made up by the best (most efficient) units

Farrell (1957) provided a methodology by which technical efficiency could be measured against an efficiency frontier, assuming constant returns to scale The production set obtained is represented by a convex set of facets, i e the production frontier obtained is the boundary of the free disposal convex hull of the data set The Farrell efficiency measures were generalized to allow for variable returns to scale technologies by Forsund and Hjalmarsson (1974, 1979 and 1987)

The DEA method is closely related to Farrell's original approach and should be regarded as an extension of that approach. It was further developed and reformulated by e g Banker, Charnes and Cooper (1984), Deprins, Simar and Tulkens (1984) and by Fare, Grosskopf and Lovell (1985), but became best known through the works of Charnes, Cooper and Rhodes (1978) and Rhodes (1978)

The DEA method rapidly gained popularity, particularly in studies of service production and sectors characterized by multiple output production Already in 1989 Seiford provided a survey of more than 300 studies applying DEA, the survey has since been updated, and Seiford (1994) lists 472 titles up to and including 1992

Compared to Farrell's approach, DEA offers a more operational framework based on the contributions by Charnes, Cooper and Rhodes who formulated the estimation of efficiency as an LP-problem, efficiency is calculated separately and directly for each

production unit in turn, while at the same time the location of the corresponding linear facets is determined This study applies Farrell type ray measures as generalized into input saving and output increasing efficiency measures by Forsund and Hjalmarsson (1974, 1979 and 1987) As outlined in the Introduction, maximizing output for a given input level seems a more reasonable objective for an individual Nicaraguan producer than minimizing input use for a certain output level In this study, the output increasing efficiency measure is thus regarded as the most relevant measure of technical efficiency

INSERT FIGURE 1

Figure 1 The Output Increasing Efficiency Measure

As illustrated by the figure, the output increasing efficiency measure, usually denoted by E_2, measures observed output relative to potential frontier output. The points a, b, c and d represent different production units The output increasing efficiency measure is derived from the reference technology x_a, a, b, c and the horizontal line to the right of c The units a, b and c are fully efficient frontier units with $E_2 = 1$ Unit d, on the other hand, is not efficient with E_2 as measured by $y_d^0 / y_d^* < 1$, where y_d^0 denotes the observed amount of output and y_d^* denotes the maximum potential amount of output for unit d For a more detailed description of different Farrell type efficiency measures and their application to Data Envelopment Analysis, see e g Hjalmarsson and Veiderpass (1992)

In this study, we do not place any restrictions on the scale properties of the underlying production technology If the underlying technology is specified in a way flexible enough to allow variable returns to scale, the resulting DEA efficiency measures would nevertheless display constant returns to scale characteristics if the actual technology in fact is characterized by constant returns to scale Furthermore, as mentioned above, in this approach the efficiency of a micro unit is measured relative to the efficiency of all the other micro units, subject to the restriction that all micro units are on or below the frontier

Consequently, the adjacent LP-problem that must be solved for different production units, e g unit d in point D with output y_d and input x_d, to obtain the output increasing efficiency measure under variable returns to scale (where λ_d is a vector containing the non-negative weights, λ_{dj}, which determine the reference point) is

$$\max_{\lambda_d} 1/E_{2d} \tag{1}$$

subject to the following restrictions

$$(1/E_{2d})\, y_{rd} \leq \sum_j^N \lambda_{dj} y_{rj}, \quad r=1,\ldots,m \tag{1a}$$

$$x_{id} \geq \sum_j^N \lambda_{dj} x_{ij}, \quad i=1,\ldots,n \tag{1b}$$

$$\sum_j^N \lambda_{dj} = 1 \tag{1c}$$

$$\lambda_{dj} \geq 0, \quad j=1,\ldots,N \tag{1d}$$

where, m is the number of outputs, n is the number of inputs and N the number of units

Restriction (1a) implies that the efficiency adjusted volume of output produced by unit d must be less than or equal to the output produced by the reference (frontier) unit while restriction (1b) implies that the volume of input used by unit d must at least amount to the input volume used by the reference unit. Restriction (1c) is the condition for variable returns to scale If this restriction is omitted, constant returns to scale is implied

For the sake of completeness and clarity, it should be pointed out that the dual

formulation of the above LP-problem is also commonly occuring According to the dual LP formulation the output efficiency measure equals the inverse of the optimum value of the LP problem (1)-(5), i e $E_2=\theta^{-1}$

$$Min\ \theta = \sum_{i=1}^{n} v_i x_{io} + v_0 \tag{1}$$

$$\sum_{k=1}^{m} u_k y_{ko} = 1 \tag{2}$$

$$-\sum_{k=1}^{m} u_k y_{kj} + \sum_{i=1}^{n} v_i x_{ij} + v_0 \geq 0 \qquad j = 1, \ldots, N \tag{3}$$

$$u_k,\ v_i \geq 0, \qquad v_0 \gtreqless 0 \tag{4}$$

where N is the number of production units, n is the number of inputs x_i and m is the number of outputs y_k

Since the optimum values of the primal and the dual formulation of an LP-problem are equal the formulation is only a matter of notation and calculation

Summary measures of efficiency for en entire sector or industry may be constructed in various ways In analogy with Farrell, this study applies an output increasing structural efficiency measure calculated as the output weighted average efficiency for the entire sector For a discussion of this kind of measures, see Farrell (*op cit*)

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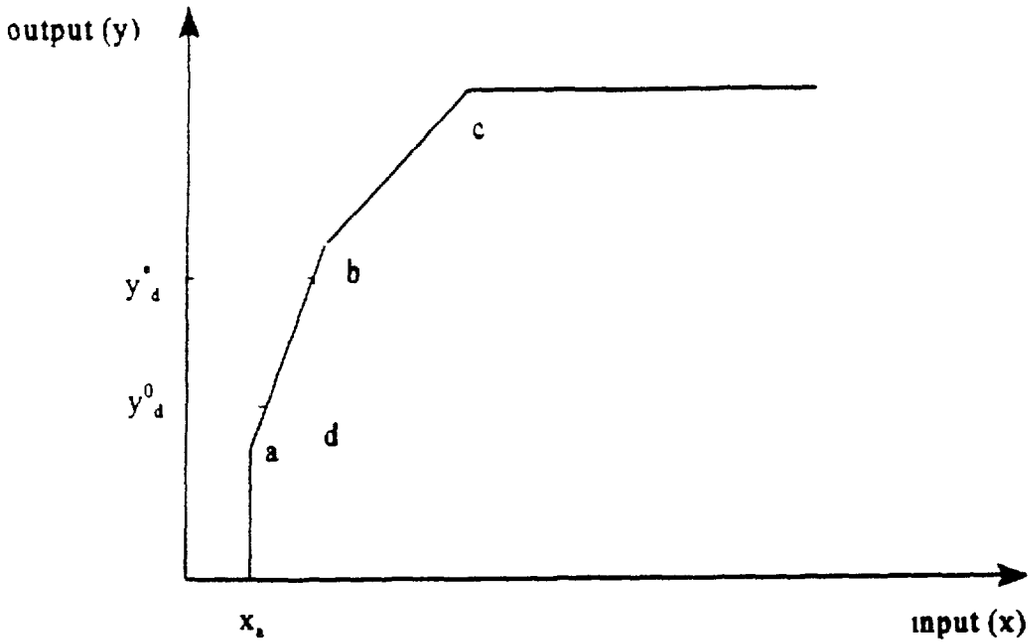

Figure 1 Illustration of the DEA Output Increasing Efficiency Measure

APPENDIX B

EMPIRICAL RESULTS

MAIN MODEL

AUXILIARY MODEL

Appendix B includes all efficiency estimates, i e estimates for the individual production units as well as for structural (total industry) efficiency

Estimates based on the main model as well as on the auxiliary model are presented

The first line of each table should be disregarded (OBS= indicates number of observations, AINP= number of inputs, AOUT= number of outputs, and SKALA= scale properties)

The production unit numbers are prefixed by the numbers 2 - 5, 2 indicating year 2 (1992), 3 indicating year 3 (1993) etc Year 1 (1991) carries no prefix or the prefix 1 or 11

CALCULATIONS: MAIN MODEL

OUTPUTMEASURE INDUSTRY 1
********** **********

OBS= 55 AINP= 4 AOUT= 1 SKALA= 3

1.	.729064231
105.	.711239978
107.	.437626030
108.	.328167009
109.	.192760274
112.	.705821752
113.	.109323747
114.	.133215255
115.	.304318627
116.	.333813724
118.	1.000000000
21.	.819192813
23.	1.000000000
24.	1.000000000
2106.	.395312805
2107.	.486380864
2109.	.330601816
2112.	1.000000000
2114.	.325842136
2115.	.416658581
2117.	.521634683
2120.	.527999565
2121.	.069423210
2122.	.694301069
2123.	.105958313
2124.	.373165034
2125.	.237048490
2126.	1.000000000
2127.	621329652

```
 2128.   .416255409
 2129.   .082653972
 2130.   .071679286
 2131.   .085991157
 2641.   .046343586
   32. 1.000000000
   34.   .586341470
 3106.   .127491818
 3109.   .459000248
 3112. 1.000000000
 3114.   .062668121
 3122.   .790880226
 3124.   .187416769
 3125.   .345298324
 3128.   .228744288
 3130.   .092984821
 3132.   .274464998
 3133. 1.000000000
 3134.   .681636612
 3135.   .060187902
   42.   .072032538
   44.   .410622673
 4118. 1.000000000
 4125.   .306075814
 4127.   .328479103
 4717. 1.000000000

STRUCT.MEASURE=  .70079


    OUTPUTMEASURE  INDUSTRY 5
    **************  ***********


OBS=   23  AINP=  4  AOUT=  1  SKALA=  3
    6. 1.000000000
    7. 1 000000000
```

```
    8. 1.000000000
  140. 1.000000000
   26. 1.000000000
   27. 1.000000000
   28. 1.000000000
   29. 1.000000000
 2140.  .902497598
 2141.  .798021099
 2142. 1.000000000
 2143.  .806282994
   36.  .780782986
   37.  .949582854
   39.  .989156622
 3145. 1.000000000
   46.  .808173128
   47. 1.000000000
   48. 1.000000000
   49.  .899712998
 4140.  .944109604
 4141.  .827463395
 4145.  .005237796

STRUCT.MEASURE=  .95117


OUTPUTMEASURE  INDUSTRY 6
    **************  ***********


OBS=    9  AINP=  4  AOUT=  1  SKALA=  3
   10. 1.000000000
  210.  .939664793
 2645. 1.000000000
 3645. 1.000000000
  411. 1.000000000
 4147. 1.000000000
 4714. 1.000000000
```

```
 [illegible]  1 000000000
    [illegible]  1 000000000

[illegible]UCT MEASURE=  .97508

    OUTPUTMEASURE  INDUSTRY 7
    **************  ***********


OBS=    3  AINP=  4  AOUT=  1  SKALA=  3
   13.  .966021526
  213. 1.000000000
  413. 1.000000000

STRUCT MEASURE=  .98896


    OUTPUTMEASURE  INDUSTRY 8
    **************  ***********

OBS=    8  AINP=  4  AOUT=  1  SKALA=  3
   14  1.000000000
   15. 1.000000000
   16. 1.000000000
  215.  .842614109
  216.  .981941484
  314. 1.000000000
  315.  .909792809
  316. 1.000000000

STRUCT MEASURE=  .96726


    OUTPUTMEASURE  INDUSTRY 9
    **************  ***********
```

OBS= 9 AINP= 4 AOUT= 1 SKALA= 3

[illegible]	.882610502
[illegible]9.	1.000000000
[illegible]50.	1.000000000
[illegible]17	1.000000000
2642.	1.000000000
3642.	1.000000000
4149.	.628092334
4642.	1.000000000
5642.	1.000000000

STRUCT.MEASURE= .94238

OUTPUTMEASURE INDUSTRY 10
********** **********

OBS= 29 AINP= 4 AOUT= 1 SKALA= 3

18.	.693385438
19.	.790756211
20.	1.000000000
21.	.583446859
22.	.378117052
157.	1.000000000
158.	.429275472
218.	.707966726
219.	1.000000000
220.	1.000000000
221.	276007912
222.	.224867424
2158.	451110012

```
2159.   .552523901
2160. 1.000000000
 319. 1.000000000
 322.   .311225214
3157.   .332566852
3158.   .560295924
3159.    155993962
3160. 1.000000000
3163.   .783625813
 419.   .812994854
 420. 1.000000000
 421.   .731611642
 422.   .650619110
4158.   .759555473
4160. 1.000000000
4715. 1.000000000

STRUCT.MEASURE=  .80731


    OUTPUTMEASURE  INDUSTRY 11
    **************  ***********


OBS=   10  AINP=  4  AOUT=  1  SKALA=  3
  165. 1.000000000
  166. 1.000000000
  167.   .956984049
  168. 1.000000000
 2167.   .898577854
 2168. 1.000000000
 3167. 1.000000000
 3168. 1.000000000
 4167  1.000000000
 4168. 1.000000000

STRUCT.MEASURE=  .96962
```

OUTPUTMEASURE INDUSTRY 12
********** **********

OBS= 23 AINP= 4 AOUT= 1 SKALA= 3

23.	1.000000000
170.	.725739955
171.	.389578854
172.	1.000000000
173.	.595567953
174.	1.000000000
175.	1.000000000
176.	1.000000000
177.	1.000000000
179.	1.000000000
180.	.901498952
181.	.927288360
182.	.907009252
183.	1.000000000
184.	.848466083
185.	1.000000000
186.	.776383122
187.	1.000000000
223.	1.000000000
2180.	1.000000000
323.	1.000000000
4718.	.766190602
4720.	1.000000000

STRUCT.MEASURE= .97863

OUTPUTMEASURE INDUSTRY 13
********** **********

OBS= 15 AINP= 4 AOUT= 1 SKALA= 3

[illegible]	1.000000000
[illegible]	.760880490
[illegible]	1.000000000
[illegible]	1.000000000
[illegible]	.943507120
[illegible]	1.000000000
221.	1.000000000
225.	.824052654
226.	1.000000000
2305.	1.000000000
325.	1.000000000
326.	.942189661
425.	1.000000000
4643.	1.000000000
525.	1.000000000

STRUCT.MEASURE= .97369

OUTPUTMEASURE INDUSTRY 16
********** **********

OBS= 14 AINP= 4 AOUT= 1 SKALA= 3

1310.	1.000000000
1311.	1.000000000
1312.	1.000000000
1313	.640194597
1314	1 000000000
1315	1 000000000
1316	1 000000000
1317	615422371
1318	1.000000000
2312	891812120
2318	1 000000000
3312	.731874076

1312. 1.000000000
1313. 1.000000000

STRUCT.MEASURE= .93577

OUTPUTMEASURE INDUSTRY 17
********** **********

OBS= 10 AINP= 4 AOUT= 1 SKALA= 3
127. .536319429
128. 1.000000000
1329. .896560094
1330. 1.000000000
227. .967343007
228. .863556125
2329. 1.000000000
327. .639825245
328. 1.000000000
3329. .597726717

STRUCT.MEASURE= .90083

OUTPUTMEASURE INDUSTRY 19
********** **********

OBS= 4 AINP= 4 AOUT= 1 SKALA= 3
29. 1.000000000
229. 1.000000000
230. 1.000000000
330. 1.000000000

STRUCT MEASURE= 1.00000

OUTPUTMEASURE INDUSTRY 20
********** **********

OBS= 7 AINP= 4 AOUT= 1 SKALA= 3

131.	1.000000000
1331.	1.000000000
1333.	1.000000000
231.	1.000000000
2333.	1.000000000
431.	1.000000000
4331.	1.000000000

STRUCT.MEASURE= .99635

OUTPUTMEASURE INDUSTRY 21
********** **********

OBS= 8 AINP= 4 AOUT= 1 SKALA= 3

132.	1.000000000
133.	1.000000000
1336.	1.000000000
232.	1.000000000
233.	.692244701
332.	.909585392
4644.	1.000000000
5644.	.952161212

STRUCT.MEASURE= .89004

OUTPUTMEASURE INDUSTRY 22

```
**************  ************

OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   34. 1.000000000
   35.  .839438748
  235. 1.000000000
  435. 1.000000000

STRUCT.MEASURE=  .96752


    OUTPUTMEASURE  INDUSTRY 24
    **************  ************


OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   37. 1.000000000
  237. 1.000000000
  337. 1.000000000
  437. 1.000000000

STRUCT.MEASURE= 1.00000


    OUTPUTMEASURE  INDUSTRY  25
    **************  *************


OBS=    6  AINP=  4  AOUT=  1  SKALA=  3
   38.  .849887682
  238. 1.000000000
  338. 1.000000000
  438. 1.000000000
 4719. 1.000000000
  538. 1.000000000
STRUCT.MEASURE=  .97109
```

OUTPUTMEASURE INDUSTRY 27
********** **********

OBS= 10 AINP= 4 AOUT= 1 SKALA= 3

343	1.000000000
344.	1.000000000
345.	639053681
346.	.819182084
347.	.529581936
348.	1.000000000
2345.	1.000000000
2346.	1.000000000
2349.	1.000000000
3345.	1.000000000

STRUCT.MEASURE= .88148

OUTPUTMEASURE INDUSTRY 29
********** **********

OBS= 11 AINP= 4 AOUT= 1 SKALA= 3

140.	1.000000000
141.	1.000000000
142.	1.000000000
143.	1.000000000
1378.	1.000000000
1379.	1.000000000
241	.834471069
341.	1.000000000
440.	758652000
441	665041051
543	1 000000000

STRUCT.MEASURE= 91381

OUTPUTMEASURE INDUSTRY 30
********** **********

OBS= 6 AINP= 4 AOUT= 1 SKALA= 3

45.	1.000000000
46.	1.000000000
245.	1.000000000
346.	1.000000000
445.	.784640548
446.	.825418558

STRUCT.MEASURE= .90255

OUTPUTMEASURE INDUSTRY 31
********** **********

OBS= 11 AINP= 4 AOUT= 1 SKALA= 3

148.	1.000000000
149.	.693783349
150.	.806761150
151.	.849490139
1401.	1.000000000
1402.	1.000000000
248.	1.000000000
250.	.647967797
251.	1.000000000
348.	.859207202
451.	1.000000000

STRUCT.MEASURE= .89992

```
    OUTPUTMEASURE  INDUSTRY 32
    **************  ************


OBS=   10  AINP=  4  AOUT=  1  SKALA=  3
  152. 1.000000000
 1415. 1.000000000
 1417. 1.000000000
  252. 1.000000000
  253. 1.000000000
  254. 1.000000000
 2417.  .730042327
 2418. 1.000000000
 2419. 1.000000000
  353. 1.000000000

STRUCT.MEASURE=  .97385


    OUTPUTMEASURE  INDUSTRY 33
    **************  ************


OBS=    5  AINP=  4  AOUT=  1  SKALA=  3
   55.  .905827479
   56. 1.000000000
   57. 1.000000000
  424. 1.000000000
  425. 1.000000000

STRUCT.MEASURE=  .98120


    OUTPUTMEASURE  INDUSTRY 35
    **************  ************

OBS=    7  AINP=  4  AOUT=  1  SKALA=  3
```

```
  433.   .633870428
  434. 1.000000000
  435. 1.000000000
 2433. 1.000000000
 2435. 1.000000000
 3433. 1.000000000
 3435. 1.000000000

STRUCT.MEASURE=  .95622


    OUTPUTMEASURE  INDUSTRY 37
    **************  ************


OBS=    7  AINP=  4  AOUT=  1  SKALA=  3
  158. 1.000000000
 1440. 1.000000000
 1441. 1.000000000
 2441.   .367530587
  358. 1.000000000
 3441. 1.000000000
 4441.   .630512491

STRUCT.MEASURE=  .94527


    OUTPUTMEASURE  INDUSTRY 38
    **************  ************


OBS=    9  AINP=  4  AOUT=  1  SKALA=  3
  159.   .889245454
 1442. 1.000000000
 1443. 1.000000000
 1444. 1.000000000
 1445. 1.000000000
```

```
  239  1.000000000
    3  1.000000000
   44. 1.000000000
   41. 1.000000000

STRUCT.MEASURE=  .97708


    OUTPUTMEASURE  INDUSTRY 40
    **************  ************

OBS=     8  AINP=  4  AOUT=  1  SKALA=  3
   60. 1.000000000
  450  1.000000000
  451. 1.000000000
  260. 1.000000000
 2450. 1.000000000
 2451. 1.000000000
  360. 1.000000000
 3450. 1.000000000

STRUCT.MEASURE=  .99707


    OUTPUTMEASURE  INDUSTRY 41
    **************  ************

OBS=     7  AINP=  4  AOUT=  1  SKALA=  3
  453. 1.000000000
  454. 1.000000000
  455  1.000000000
  456  1.000000000
  457  1.000000000
  458. 1.000000000
 2459  1.000000000

STRUCT MEASURE=  .99280
```

OUTPUTMEASURE INDUSTRY 44
********** **********

OBS= 4 AINP= 4 AOUT= 1 SKALA= 3

62.	1.000000000
262.	.921501514
362.	1.000000000
462.	1.000000000

STRUCT.MEASURE= .98274

OUTPUTMEASURE INDUSTRY 46
********** **********

OBS= 18 AINP= 4 AOUT= 1 SKALA= 3

63.	.741851063
64.	.777271682
65.	.419286221
471.	1.000000000
472.	1.000000000
473.	.838494459
474.	1.000000000
475.	1.000000000
476.	.695529523
263.	.738440891
265.	.591865979
2477.	.488931390
363.	.743027871
3473.	1.000000000
463.	1.000000000
4471.	1.000000000
4473.	1.000000000
4476.	1.000000000

STRUCT.MEASURE= .86582

```
    OUTPUTMEASURE  INDUSTRY 47
    **************  ************


OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   66. 1.000000000
  478. 1.000000000
  266. 1.000000000
  366. 1.000000000

STRUCT.MEASURE=  .99206


    OUTPUTMEASURE  INDUSTRY 48
    **************  ************


OBS=   16  AINP=  4  AOUT=  1  SKALA=  3
   67. 1.000000000
  479. 1.000000000
  480.  .991063292
  481.  .937393761
  482.  .869270786
  483. 1.000000000
  484. 1.000000000
  267.  .588156880
  268. 1.000000000
 2480. 1.000000000
 2481. 1.000000000
 2482. 1.000000000
 2483.  .821990487
  368.  .863614628
 3482.  .881797369
 4479. 1.000000000

STRUCT.MEASURE=  .91825
```

OUTPUTMEASURE INDUSTRY 49
********** **********

OBS= 24 AINP= 4 AOUT= 1 SKALA= 3

69.	1.000000000
70.	1.000000000
71.	1.000000000
72.	1.000000000
73.	.855305887
74.	.994583423
485.	1.000000000
486.	1.000000000
487.	1.000000000
488.	.349076423
489.	1.000000000
490.	.971455865
269.	.445136085
271.	.078954318
272.	.710529237
274.	1.000000000
2488.	.908267432
2489.	.995426698
374.	1.000000000
3488.	.922888420
474.	1.000000000
4488.	.746302509
4489.	.973491185
4491.	1.000000000

STRUCT.MEASURE= .95452

```
     OUTPUTMEASURE  INDUSTRY 50
     **************  ************


OBS=     4  AINP=  4  AOUT=  1  SKALA=  3
    75  1.000000000
    76  1.000000000
   276   .971246410
   376. 1.000000000

STRUCT.MEASURE=  .99332


     OUTPUTMEASURE  INDUSTRY 51
     **************  ************


OBS=     6  AINP=  4  AOUT=  1  SKALA=  3
    77. 1.000000000
   496. 1.000000000
   497. 1.000000000
   277. 1.000000000
   377. 1.000000000
   477. 1.000000000

STRUCT.MEASURE=  .98992


     OUTPUTMEASURE  INDUSTRY 53
     **************  ************


OBS=    14  AINP=  4  AOUT=  1  SKALA=  3
    78  1.000000000
    79  1 000000000
    80  1 000000000
   500  1.000000000
```

```
  501. 1.000000000
  279.  .638635421
  281. 1.000000000
 2500. 1.000000000
  279. 1.000000000
 3500. 1.000000000
  479.  .893395479
  480.  .797810606
  481.  .400217770
  581.  .514259275

STRUCT.MEASURE=  .90562


    OUTPUTMEASURE  INDUSTRY 54
    **************  ************


OBS=    5  AINP=  4  AOUT=  1  SKALA=  3
   82. 1.000000000
  503. 1.000000000
  504. 1.000000000
  282. 1.000000000
  382. 1.000000000

STRUCT.MEASURE=  .99931


    OUTPUTMEASURE  INDUSTRY 55
    **************  ************

OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   83. 1.000000000
   84. 1.000000000
  506. 1.000000000
  284. 1.000000000
STRUCT MEASURE=  .99483
```

```
    OUTPUTMEASURE  INDUSTRY 57
    **************  ************


OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   85. 1.000000000
  285.  .900173566
  385. 1.000000000
  485. 1.000000000

STRUCT.MEASURE=  .97547


    OUTPUTMEASURE  INDUSTRY 58
    **************  ************


OBS=   18  AINP=  4  AOUT=  1  SKALA=  3
   86. 1.000000000
  508. 1.000000000
  509.  .444436123
  510.  .787246753
  511. 1.000000000
  512. 1.000000000
  286.  .630200790
 2508.  .970621923
 2509.  .640739194
 2513. 1.000000000
 2514. 1.000000000
  386.  .787299385
 3508. 1.000000000
 3513. 1.000000000
 3514. 1.000000000
  486.  .943832956
 4508.  .863969995
 4513.  .400140917
STRUCT.MEASURE=  .84378
```

71

```
    OUTPUTMEASURE  INDUSTRY 60
    **************  ************


OBS=    3  AINP=  4  AOUT=  1  SKALA=  3
   87. 1.000000000
  287. 1.000000000
  487. 1.000000000

STRUCT.MEASURE= 1.00000


    OUTPUTMEASURE  INDUSTRY 64
    **************  ************


OBS=   19  AINP=  4  AOUT=  1  SKALA=  3
   89. 1.000000000
   90. 1.000000000
   91. 1.000000000
  538.  .535820510
  539. 1.000000000
  289. 1.000000000
  290. 1.000000000
  291.  .890030908
 2538.  .910179704
 2539. 1.000000000
 2540. 1.000000000
 3539. 1.000000000
 3541. 1.000000000
 3542.  .370340072
  489. 1.000000000
  491.  .699905696
 4539. 1.000000000
 4541. 1.000000000
 4542. 1.000000000
STRUCT.MEASURE=  .92614
```

72

```
    OUTPUTMEASURE  INDUSTRY 66
    **************  ************


OBS=     8  AINP=  4  AOUT=  1  SKALA=  3
   92. 1.000000000
   93. 1.000000000
  545.  .722267428
  292. 1.000000000
  293. 1.000000000
 2545. 1.000000000
 3545. 1.000000000
  493. 1.000000000

STRUCT.MEASURE=  .98991


    OUTPUTMEASURE  INDUSTRY 67
    **************  ************


OBS=     7  AINP=  4  AOUT=  1  SKALA=  3
   94. 1.000000000
  552. 1.000000000
  553. 1.000000000
  554. 1.000000000
  555. 1.000000000
 2554.  .979717050
  394. 1.000000000

STRUCT.MEASURE=  .99448
```

```
OUTPUTMEASURE  INDUSTRY 68
**************  ************


OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
   95. 1.000000000
  295. 1.000000000
  395. 1.000000000
  495. 1.000000000

STRUCT.MEASURE= 1.00000


OUTPUTMEASURE  INDUSTRY 69
**************  ************


OBS=    5  AINP=  4  AOUT=  1  SKALA=  3
   96. 1.000000000
  559. 1.000000000
  296.  .732264585
  396. 1.000000000
  496. 1.000000000

STRUCT.MEASURE=  .95220


OUTPUTMEASURE  INDUSTRY 73
**************  ************


OBS=    9  AINP=  4  AOUT=  1  SKALA=  3
   98. 1.000000000
   99. 1.000000000
  298.  .911281458
  299. 1.000000000
 2100.  .717289645
```

```
  398. 1.000000000
 3100.  .675283271
  498. 1.000000000
 4100. 1.000000000

STRUCT.MEASURE=  .93732


    OUTPUTMEASURE  INDUSTRY 78
    **************  ************


OBS=    9  AINP=  4  AOUT=  1  SKALA=  3
  102. 1.000000000
  574. 1.000000000
  575. 1.000000000
  576. 1.000000000
  577. 1.000000000
 2102. 1.000000000
 2574. 1.000000000
 2576. 1.000000000
 4576.  .550718790

STRUCT.MEASURE=  .97600


    OUTPUTMEASURE  INDUSTRY 79
    **************  ************


OBS=    4  AINP=  4  AOUT=  1  SKALA=  3
  635. 1.000000000
 2635.  .966462660
 3635. 1.000000000
 4635. 1.000000000

STRUCT.MEASURE=  .99183
```

75

OUTPUTMEASURE INDUSTRY 80
********** **********

OBS= 5 AINP= 4 AOUT= 1 SKALA= 3

104.	1.000000000
637.	1.000000000
2104.	1.000000000
3104.	1.000000000
4104.	.961156615

STRUCT.MEASURE= .99110

CALCULATIONS : AUXILIARY MODEL

OUTPUTMEASURE INDUSTRY 1
********** **********

OBS= 75 AINP= 2 AOUT= 1 SKALA= 3

1.	.729064231
2.	157450346
105.	.682212918
106.	.035106466
107.	.437626030
108.	.285855929
109.	.086894145
110.	.080105263
111.	.181345623
112.	.705821752
113.	.096099048
114.	.102392935
115.	.274379769
116.	.333813724
117.	.029457531
118.	.065964853
119.	.211840628
21.	.819192813
22.	.062800592
23.	1.000000000
24.	1.000000000
2106.	.100526536
2107	.469475903
2109	.109879427
2112	1.000000000
2114	.144658130
2115	.348001025
2117	.075570834
2119	1.000000000

2120	.154538248
2121.	.062482589
2122.	.384900600
2123.	.016874069
2124.	.113437269
2125.	.108341442
2126.	.009484944
2127.	.007790785
2128.	.088165224
2129.	.015102953
2130.	.042902844
2131.	.070387820
2641.	.027276396
31.	.766535897
32.	.167253780
34.	.586341470
35.	.160331641
3106.	.089160004
3108.	.060412701
3109.	.098499468
3112.	.054640674
3114.	.030572874
3119.	.105582751
3122.	.301289230
3124.	.058504321
3125.	.053264905
3126.	.098254513
3128.	.115521616
3130.	.037228778
3132.	.100666450
3133.	.087381154
3134.	.110239043
3135.	.014520031
3136.	.125267696
3137.	1.000000000
3138.	.034681837
42.	.052045864

```
   44.  .292497673
   45.  .296356787
 4109.   159055339
 4115  1.000000000
 4118.  .019235739
 4125.  .060779249
 4127.  .071794180
 4131.  .185277998
 4717.  .473842533

STRUCT.MEASURE=  .62679


    OUTPUTMEASURE    INDUSTRY 3
    **************   **********

OBS=    3  AINP=  2  AOUT=  1  SKALA=  3
  139. 1.000000000
 3139. 1.000000000
 4139. 1.000000000

STRUCT.MEASURE= 1.00000


    OUTPUTMEASURE   INDUSTRY 5
    **************  **********


OBS=   24  AINP=  2  AOUT=  1  SKALA=  3
    6.  .134718974
    7.  .187214404
    8. 1.000000000
  140.  .671584715
   26.  .393157894
   27.  .295328158
   28.  .691439799
   29.  .788987932
```

2140.	.576339757
2141.	.453016229
2142.	.183135456
2143.	.282658498
36.	.190497344
37.	.251214284
39.	.836695569
3144.	1.000000000
3145.	1.000000000
46.	.230131960
47.	.326806254
48.	1.000000000
49.	.741139063
4140.	.659867127
4141.	.378688995
4145.	.001765412

STRUCT.MEASURE= .69119

OUTPUTMEASURE INDUSTRY 6
********** **********

OBS= 16 AINP= 2 AOUT= 1 SKALA= 3

10.	.518750220
210.	.605910767
211.	1.000000000
2146.	.071142092
2645.	.476752404
311.	1.000000000
312.	1.000000000
3147.	1.000000000
3148.	.082962586
3645.	.165753194

```
 111. 1.000000000
 112   .435468517
 113    265074612
 714   .943721878
 716  1 000000000
2545  1 000000000

STRUCT.MEASURE=  .83235


    OUTPUTMEASURE   INDUSTRY 7
    **************   ***********


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   13.  .724911791
  213.  .463096066
  313. 1.000000000
  413. 1.000000000

STRUCT.MEASURE=  .85183


    OUTPUTMEASURE     INDUSTRY 8
    **************     ***********


OBS=    9  AINP=  2  AOUT=  1  SKALA=  3
   14  1.000000000
   15   .707491511
   16. 1.000000000
  214. 1.000000000
  215.  .693251884
  216.  .845269714
  314. 1.000000000
  315   .720606935
```

316. 1.000000000

STRUCT.MEASURE= .88093

OUTPUTMEASURE INDUSTRY 9
********** **********

OBS= 16 AINP= 2 AOUT= 1 SKALA= 3

17.	.842776475
149.	1.000000000
150.	.471539279
217.	1.000000000
2151.	.084454522
2642.	.602427996
3152.	.169099919
3153.	1.000000000
3154.	.056467345
3642.	.608357423
4149.	.470389506
4152.	.134005036
4642.	1.000000000
4646.	1.000000000
4647.	.481022343
5642.	1.000000000

STRUCT.MEASURE= .82928

OUTPUTMEASURE INDUSTRY 10
********** **********

OBS= 37 AINP= 2 AOUT= 1 SKALA= 3

18. .596601800

19.	.687370284
20.	1.000000000
21.	.550565754
22.	.053978591
156.	.081365712
157.	.494020482
158.	.403095822
218.	.386491915
219.	1.000000000
220.	.958440834
221.	.256381704
222.	.076373239
2155.	.051019240
2158.	.426109058
2159.	.229365665
2160.	.024868889
319.	.327291637
322.	.078154036
3157.	.030455356
3158.	.535639735
3159.	.072376064
3160.	.028747401
3161.	1.000000000
3162.	.050795471
3163.	.034005344
3164.	.367410646
419.	.286971880
420.	1.000000000
421.	.612068448
422.	.058721584
4157.	.436553212
4158.	.734104761
4160.	.111686004
4162.	.155030093
4715.	.715991038
4722.	.130866789

STRUCT.MEASURE= .72780

OUTPUTMEASURE INDUSTRY 11
********** **********

OBS= 16 AINP= 2 AOUT= 1 SKALA= 3

165.	1.000000000
166.	.609055502
167.	.874958397
168.	1.000000000
2165.	.947065483
2166.	1.000000000
2167.	.717618130
2168.	1.000000000
2169.	1.000000000
3165.	.833608114
3166.	1.000000000
3167.	.971841853
3168.	1.000000000
4165.	.498501516
4167.	1.000000000
4168.	1.000000000

STRUCT.MEASURE= .92083

OUTPUTMEASURE INDUSTRY 12
********** **********

OBS= 227 AINP= 2 AOUT= 1 SKALA= 3

23.	1.000000000
170.	.257248126
171.	.288683608
172.	.408277610
173.	.213451976
174.	.177590872

175.	.352780505
176	513542578
177	166202628
178	962451363
179	742938854
180	.715105060
181.	.315137135
182.	.297081930
183.	1.000000000
184.	.471218809
185.	1.000000000
186.	.290462880
187.	1.000000000
2223.	.978304795
22180.	.625630389
22188.	.222594860
22189.	.053606175
22190.	.370708972
22193.	.188813034
22197.	.076525761
22198.	.266802503
22202.	.296557482
22204.	.155060200
22207.	.465984185
22212.	.237867732
22213.	.361746953
22216.	.270637268
22217.	.193532193
22218	.294159465
22221	465283537
22223	.089087783
22224.	.123179491
22225	248288939
22227	122052816
22228	.112800503
22229	790098121
22230	279129727

85

22233.	.176987690
22234.	.589888245
22236.	.064198137
22237.	.102232013
22240.	.356766760
22241.	.374096254
22244.	.317957224
22245.	.123008570
22246.	.053075595
22247.	.209343620
22248.	1.000000000
22250.	.412397219
22253.	1.000000000
22254.	.452044622
22258.	.209786205
22259.	.243474917
22263.	.323301236
22265.	.395367932
22272.	.775111240
22273.	.176172486
22274.	.302390973
22276.	.220168789
22277.	.219615964
22278.	.100871580
323.	1.000000000
3174.	1.000000000
3178.	.605751412
3183.	.335439026
3184.	.761985497
3188.	.132921120
3191.	.135118793
3192.	.417624776
3194.	.273079232
3195.	.202382950
3196.	.279649915
3199.	.209262648
3200.	.417903472

3201.	.065076803
3202.	.240904077
3203.	.131675944
3204.	.174426443
3205.	.270707916
3206.	.673842048
3208.	1.000000000
3209.	.259576312
3210.	.187895926
3211.	.311492311
3212.	.442893019
3214.	.220211972
3215.	.291176276
3216.	.360423614
3218.	.282382865
3219.	.273453955
3220.	.368665962
3222.	.161194872
3223.	.241992233
3224.	.122730851
3225.	.175492337
3226.	.226154665
3228.	.584955892
3230.	.248392565
3231.	.179084965
3232.	.233800557
3233.	.300322072
3234.	.207717738
3235.	.107855047
3236.	.135065325
3237.	.095291981
3238.	.247837902
3239.	.325241389
3241.	.278327072
3242.	.392231663
3243.	.272333445
3244.	.185468301

3245.	.710369066
3247.	.126217344
3248.	.358388189
3249.	.201608233
3250.	.527383591
3251.	.226970563
3254.	.444742061
3255.	.346740496
3256.	.242616738
3257.	.190598348
3258.	.306003871
3259.	.509820151
3260.	.188780860
3261.	.164160363
3262.	.768812712
3264.	.232165092
3266.	.304103266
3267.	.231554746
3268.	.380196062
3269.	.070756436
3270.	.364488110
3271.	.269522296
3273.	.422554673
3274.	.624328919
3275.	.580590332
3276.	.370247519
3277.	.295027441
3278.	.157860425
3279.	.171339504
3280.	.562838382
3281.	.347792592
3282.	.236461623
3283.	.050847816
3284.	.383262677
3285.	.253042774
3286.	.349065754
3287.	.278752977

3288.	.327754821
3289	.232132518
3290	.123541267
3291	188750998
3292	.168215643
3293.	.190122263
3294	.205627907
3295	1.000000000
3296	.392189715
3297.	.300582965
3298.	.638421367
3299.	.642903922
3300.	.241435995
3301.	.225403898
4174.	.365364138
4183.	.455420648
4188.	.256055812
4189.	.146720254
4193.	.211471856
4195.	.211366577
4198.	.298280978
4200.	.398230160
4203.	.787439480
4206.	.520381416
4211.	.548387934
4212.	.200874022
4213.	.296846216
4214.	.227970189
4215.	.247981538
4216.	.387268762
4219	.231749266
4228	.460259427
4229.	.249431286
4232	.128828307
4233.	.429567804
4234	.114802737
4235	366272415

89

4244	.182434281
4245.	.673752041
4247	088702255
4249.	.125262969
4250.	.483603789
4253.	.242072535
4254.	.505407021
4255.	1.000000000
4256.	1.000000000
4258.	.288648654
4262.	.337175776
4267.	.371045323
4269.	.199169415
4273.	.602531080
4274.	.492275732
4275.	.935442308
4277.	.300815027
4278.	.168101904
4285.	.158970314
4292.	.116120125
4298.	.335322953
4651.	.101021628
4653.	1.000000000
4654.	.629045831
4656.	.106423548
4658.	.514526305
4659.	.323408829
4662.	1.000000000
4664.	.667070615
4667.	.777044317
4671.	.378850221
4718.	.663269175
4720.	1.000000000
4721.	.180116719
4724.	.090985280
4725.	.253063322

STRUCT MEASURE= .79771

```
    OUTPUTMEASURE  INDUSTRY 13
    **************  ************


OBS=   15  AINP=  2  AOUT=  1  SKALA=  3
 1124. 1.000000000
 1125.  .589233791
 1126. 1.000000000
11302. 1.000000000
11303.  .943507120
11304.  .500271751
  224. 1.000000000
  225.  .582286218
  226.  .395851803
 2305.  .847115698
  325.  .689062682
  326.  .481939261
  425.  .369403577
 4643.  .749220959
  525. 1.000000000

STRUCT.MEASURE=  .82075


    OUTPUTMEASURE    INDUSTRY 15
    **************    ************

OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
 1308. 1.000000000
 2309. 1.000000000
 3308. 1 000000000
 4308.   789345706

STRUCT.MEASURE=  .96519
```

OUTPUTMEASURE INDUSTRY 16

********** **********

OBS= 36 AINP= 2 AOUT= 1 SKALA= 3

1310.	.478903043
1311.	.198770270
1312.	1.000000000
1313.	.183055402
1314.	.305715703
1315.	.474333293
1316.	1.000000000
1317.	.371747630
1318.	1.000000000
2310.	.453723856
2312.	.889576340
2317.	.262313773
2318.	1.000000000
2319.	.256834212
2320.	.144884621
2325.	.118978856
2326.	.137555090
3310.	.456905483
3311.	.763287676
3312.	.727678033
3317.	.152601768
3319.	1.000000000
3320.	1.000000000
3321.	.233245069
3322.	.503618267
3323.	1.000000000
3324.	1.000000000
3325.	.233092541
3326.	.633359993
3327.	1.000000000
3328.	.469392139
4311.	169045550

92

```
 1312  1 000000000
  213  1.000000000
 1220  1 000000000
 1223  1.000000000

STRUCT MEASURE=  .85931


    OUTPUTMEASURE   INDUSTRY 17
    **************  ************


OBS=   10  AINP=  2  AOUT=  1  SKALA=  3
  127.  .536319429
  128. 1.000000000
 1329.  .756193212
 1330. 1.000000000
  227   .514458462
  228.  .863556125
 2329. 1.000000000
  327.  .437727748
  328. 1.000000000
 3329   .593309916

STRUCT.MEASURE=  .87714


    OUTPUTMEASURE    INDUSTRY 19
    **************   ************

OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
  129  1.000000000
  229  1.000000000
  230  1 000000000
  330    904556696

STRUCT MEASURE=   96117
```

OUTPUTMEASURE INDUSTRY 20
********** **********

OBS= 10 AINP= 2 AOUT= 1 SKALA= 3

131.	1.000000000
1331.	1.000000000
1333.	.314870004
231.	1.000000000
2333.	.363634762
3332.	.156728440
3334.	1.000000000
3335.	.300022725
431.	1.000000000
4331.	.677499069

STRUCT.MEASURE= .91492

OUTPUTMEASURE INDUSTRY 21
********** **********

OBS= 8 AINP= 2 AOUT= 1 SKALA= 3

132.	1.000000000
133.	1.000000000
1336.	1.000000000
232	.212523965
233.	.692244701
332.	.238918243
4644	1.000000000
5644.	.228720209

STRUCT.MEASURE= .87300

```
    OUTPUTMEASURE   INDUSTRY 22
    **************  ************


OBS=     4  AINP=  2  AOUT=  1  SKALA=  3
  134. 1.000000000
  135.  .798354635
  235  1.000000000
  435. 1.000000000

STRUCT.MEASURE=  .96263



    OUTPUTMEASURE  INDUSTRY 23
    **************  ************

OBS=     5  AINP=  2  AOUT=  1  SKALA=  3
  136. 1.000000000
  236.  .691931540
 2337. 1.000000000
 3337.  .206765620
 3338. 1.000000000

STRUCT.MEASURE=  .85567



    OUTPUTMEASURE    INDUSTRY 24
    **************   ************


OBS=     6  AINP=  2  AOUT=  1  SKALA=  3
   37. 1.000000000
  237.  .862641332
 2339. 1.000000000
  337.  .916416865
```

95

```
 3339. 1.000000000
  437. 1.000000000

STRUCT.MEASURE=  .94756


    OUTPUTMEASURE  INDUSTRY 25
    **************  ***********


OBS=    6  AINP=  2  AOUT=  1  SKALA=  3
   38.  .827428724
  238.  .938784572
  338. 1.000000000
  438.  .741481505
 4719. 1.000000000
  538. 1.000000000

STRUCT.MEASURE=  .91442


    OUTPUTMEASURE   INDUSTRY 26
    **************   ***********


OBS=    5  AINP=  2  AOUT=  1  SKALA=  3
   39. 1.000000000
 2340.  .967141403
 2341.  .255024585
 3342. 1.000000000
 4341.  .094650206

STRUCT.MEASURE=  .98275
```

OUTPUTMEASURE INDUSTRY 27
********** **********

OBS= 55 AINP= 2 AOUT= 1 SKALA= 3

343.	.085327466
344.	056416369
345.	.595834443
346.	.462992694
347.	.214052138
348.	1.000000000
2345.	1.000000000
2346.	.547598461
2349.	.458054460
2350.	.234681350
2351.	.241587650
2352.	.199343803
2353.	.069694456
2354	.558576565
2355	.180316503
2356.	.580486487
2357.	.216613037
2358.	.096203875
2359.	.283682405
2360.	1.000000000
2361.	.256312839
2363.	.135567855
2364	.134754722
2365.	.333357125
2366.	.449007414
2367	.319768906
2369.	.115430458
2370.	1.000000000
2371	.064381944
2372	.110500116
2373	578162611
3343	127991198

3345. .929039888
3350. .163104964
3351. .282943720
3352. .199625376
3353. .033133467
3356. .078324224
3357. .129562917
3358. .173437072
3359. .348394065
3361. 1.000000000
3362. .128853459
3363. .254972340
3364. 1.000000000
3365. .106442202
3366. .321851819
3368. .476236064
3370. .233858073
3371. .179258141
3374. .539362403
3375. .625921312
3376. .279850860
3377. .070130077
4372. .165601777

STRUCT.MEASURE= .59677

OUTPUTMEASURE INDUSTRY 29
********** **********

OBS= 34 AINP= 2 AOUT= 1 SKALA= 3
40. 1.000000000
41. 1.000000000
42. 1.000000000
43. 1.000000000

378.	.168658222
379.	.153397516
241.	631344166
242.	.445498144
2378.	.013498419
2379.	.230587272
2380.	1.000000000
2381.	.114709697
2382.	.673834405
2383.	.158950435
2384.	.340506140
2385.	.209616781
2387.	1.000000000
2388.	.292071245
2389.	.129437111
341.	1.000000000
3378.	.026566634
3381.	1.000000000
3385.	.669464544
3386.	.510849277
3387.	.927325285
3388.	.108574396
3390.	.882703351
3391.	.209415552
3392.	.453561765
440.	.592644949
441.	.438346135
4380.	.388064905
4682.	.569301744
543.	1.000000000

STRUCT.MEASURE= .82841

```
    OUTPUTMEASURE   INDUSTRY 30
    **************  ***********


OBS=   21  AINP=  2  AOUT=  1  SKALA=  3
   45.  .163495019
   46.  .849577319
  245.  .590748845
 2393.  .627012765
 2394.  .101811974
 2395.  .327113076
 2396.  .205439408
 2397. 1.000000000
 2398.  .670374566
  346. 1.000000000
  347.  .320936144
 3393.  .575455557
 3394.  .599951262
 3395. 1.000000000
 3396.  .133802035
 3398. 1.000000000
 3399.  .338108300
 3400.  .400419926
  445.  .645592412
  446.  .825418558
  447. 1.000000000

STRUCT.MEASURE=  .77786


    OUTPUTMEASURE  INDUSTRY 31
    **************  ***********

OBS=   31  AINP=  2  AOUT=  1  SKALA=  3
   48. 1.000000000
   49.  .134528625
```

50	679368140
5..	.634323185
401	1.000000000
402	1 000000000
248	1.000000000
250.	.466433737
251.	1.000000000
2401.	257359367
2404	320271517
2405.	.217277046
2406.	.364386288
2407.	305003065
2409.	.149929943
2411.	.456008379
2412.	.306301824
2413.	1.000000000
348.	.664221498
3401.	.577815647
3403.	.253915617
3404.	.039273823
3405.	.635443433
3407.	.322142094
3408.	.384670984
3409.	.257983159
3410.	702968865
3411.	.223341300
3412	.283139094
3414	.407495765
451.	692612994

STRUCT MEASURE= .79668

```
OUTPUTMEASURE   INDUSTRY 32
**************  ************


OBS=   19  AINP=  2  AOUT=  1  SKALA=  3
   52. 1.000000000
  415.  .619360816
  416.  .166620706
  417. 1.000000000
  252.  .871925204
  253.  .797178237
  254.  .288716111
 2416.  .278748953
 2417.  .408360981
 2418.  .808942966
 2419.  .695310051
  352. 1.000000000
  353.  .379703891
  354.  .296920327
 3416.  .127358639
 3420. 1.000000000
 3421.  .215000861
 3422. 1.000000000
 3423.  .098521686

STRUCT.MEASURE=  .74555


OUTPUTMEASURE  INDUSTRY 33
**************  ************


OBS=   13  AINP=  2  AOUT=  1  SKALA=  3
   55   .604286833
   56   .516617437
   57. 1.000000000
```

102

```
  424. 1.000000000
  425   .477435450
 2426.  .558361348
 2427.  .350084156
 2428. 1.000000000
 3426. 1.000000000
 3429.  .301133888
 3430. 1.000000000
 3431.  .974038973
 4427.  .602176375

STRUCT.MEASURE=  .84588


    OUTPUTMEASURE   INDUSTRY 35
    **************   ************


OBS=   12  AINP=  2  AOUT=  1  SKALA=  3
  433.  .633870428
  434. 1.000000000
  435. 1.000000000
 2433.  .601023860
 2434.  .345810128
 2435. 1.000000000
 3433.  .498594865
 3434.  .334980205
 3435.  .690464138
 3436. 1.000000000
 3437.   251272969
 3438.  .300546448

STRUCT MEASURE=   80707
```

OUTPUTMEASURE INDUSTRY 37
********** **********

OBS= 7 AINP= 2 AOUT= 1 SKALA= 3

158.	1.000000000
1440.	1.000000000
1441.	1.000000000
2441.	.276568983
358.	.799374538
3441.	1.000000000
4441.	.630512491

STRUCT.MEASURE= .89322

OUTPUTMEASURE INDUSTRY 38
********** **********

OBS= 15 AINP= 2 AOUT= 1 SKALA= 3

159.	.659642327
1442.	1.000000000
1443.	1.000000000
1444.	.711146358
1445.	.595893894
259.	.719794413
2443.	1.000000000
2444.	.661371324
2446.	.065108514
2447.	.288870323
3444.	1.000000000
3446.	1.000000000
3447.	.268511705
3448	194260176

4444. .652337013

STRUCT MEASURE= 88433

OUTPUTMEASURE INDUSTRY 40
********** **********

OBS= 10 AINP= 2 AOUT= 1 SKALA= 3
60. 1 000000000
450. .484061713
451. 1.000000000
260. 1.000000000
2450. 1.000000000
2451. .761179788
2452. 1.000000000
360. .880690889
3450. .777398921
3452. 1.000000000

STRUCT.MEASURE= .88461

OUTPUTMEASURE INDUSTRY 41
********** **********

OBS= 24 AINP= 2 AOUT= 1 SKALA= 3
453 .466195164
454. .937442313
455. .233242921
456. 451594066
457 1 000000000
458 198138473
2455. 392096167
2458. 255508341
2459 1 000000000

```
 2460.   .448764864
 2467.   .298386410
 3454.   .589112865
 3455.   .379144227
 3456.   .332043885
 3459.   .162321571
 3460. 1.000000000
 3461.   .396691090
 3462. 1.000000000
 3463. 1.000000000
 3464. 1.000000000
 3465.   .433104853
 3466.   .470586891
 3468.   .293139049
 3469.   .389713336

STRUCT.MEASURE=  .63284


    OUTPUTMEASURE   INDUSTRY 44
    **************   ************


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   62.   .983361235
  262.   .697228914
  362.   .751942891
  462. 1.000000000

STRUCT.MEASURE=  .87514
```

106

```
    OUTPUTMEASURE  INDUSTRY 46
    **************  ***********


OBS=   19  AINP=  2  AOUT=  1  SKALA=  3
   63.  .704863287
   64.  .409825661
   65.  .055705132
  471. 1.000000000
  472. 1.000000000
  473.  .644195252
  474. 1.000000000
  475. 1.000000000
  476.  .281696186
  263.  .698637646
  265.  .054583225
 2471.  .238221063
 2477.  .261047710
  363.  .612753966
 3473.  .053228979
  463. 1.000000000
 4471.  .313193737
 4473.  .827863111
 4476.  .054604659

STRUCT.MEASURE=  .72607


    OUTPUTMEASURE   INDUSTRY 47
    **************   ***********


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   66. 1.000000000
  478. 1.000000000
  266.  .431194492
```

107

```
  266. 1.000000000

STRUCT.MEASURE=  .86040


    OUTPUTMEASURE   INDUSTRY 48
    *************   ***********


OBS=   17  AINP=  2  AOUT=  1  SKALA=  3
   67. 1.000000000
  479. 1.000000000
  480.  .531233438
  481.  .541039876
  482.  .869270786
  483. 1.000000000
  484. 1.000000000
  267.  .362743478
  268.  .844222921
 2480.  .594628786
 2481. 1.000000000
 2482. 1.000000000
 2483.  .692198188
  368.  .600796957
 3479.  .510971879
 3482.  .524201432
 4479.  .562608591

STRUCT.MEASURE=  .80563
```

OUTPUTMEASURE INDUSTRY 49
********** **********

OBS= 33 AINP= 2 AOUT= 1 SKALA= 3

69.	.067264501
70.	1.000000000
71.	.428994816
72	1.000000000
73.	.527270480
74.	.992046311
485.	1.000000000
486.	.635914754
487.	1.000000000
488.	.271944500
489.	.654267698
490.	.664505270
269.	.119334510
271.	.041265828
272.	.468514583
274.	1.000000000
2485.	.290573516
2488.	.452816632
2489.	.820147530
2490.	1.000000000
2493.	1.000000000
2494	.846288885
371	.272598755
374	.892128391
3485.	.259068584
3488.	.724973069
3491.	.561268840
3492.	1.000000000
3493	1.000000000
474.	.849642478
4488.	.402134608
4489	.709241827

```
 4491.  .622638268

STRUCT.MEASURE=  .83699


    OUTPUTMEASURE   INDUSTRY 50
    **************   ************


OBS=    7  AINP=  2  AOUT=  1  SKALA=  3
   75. 1.000000000
   76. 1.000000000
  276.  .520128152
 2495. 1.000000000
  375. 1.000000000
  376.  .559692757
  476.  .174994261

STRUCT.MEASURE=  .81201


    OUTPUTMEASURE  INDUSTRY 51
    **************  ************


OBS=   11  AINP=  2  AOUT=  1  SKALA=  3
   77.  .460863694
  496. 1.000000000
  497. 1.000000000
  277.  .467963208
 2496.  .722871363
 2497.  .670073236
 2498. 1.000000000
  377  1.000000000
 3496. 1.000000000
```

```
  477.   .717310162
 4496  1.000000000

STRUCT.MEASURE=  .81199


    OUTPUTMEASURE  INDUSTRY 53
    **************  ***********


OBS=   16  AINP=  2  AOUT=  1  SKALA=  3
   78   .946098744
   79.  .771767133
   80. 1.000000000
  500.  .782024702
  501. 1.000000000
  279.  .224548660
  281. 1.000000000
 2500.  .585009313
  379.  .294900809
 3500.  .617853561
 3502.  .987251346
  479.  .526952822
  480.  .748159987
  481.  .245316637
 4502. 1.000000000
  581.  .452333593

STRUCT.MEASURE=  .74996


    OUTPUTMEASURE   INDUSTRY 54
    **************   ***********

OBS=   12  AINP=  2  AOUT=  1  SKALA=  3
   82   .682044127
```

```
  503. 1.000000000
  504.  .077638776
  282.  .681850100
 2503. 1.000000000
 2504.  .083256338
  382.  .537696799
 3504.  .058051223
 3505. 1.000000000
 4503.  .044108951
 4504. 1.000000000
 4723.  .037382659

STRUCT.MEASURE=  .69330



    OUTPUTMEASURE  INDUSTRY 55
    **************  ************


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   83. 1.000000000
   84. 1.000000000
  506. 1.000000000
  284. 1.000000000

STRUCT.MEASURE=  .94987


    OUTPUTMEASURE  INDUSTRY 57
    **************  ************


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   85. 1.000000000
  285.   861999663
  385  1.000000000
```

112

```
  485    668989080

STRUCT.MEASURE=  .89940



    OUTPUTMEASURE INDUSTRY 58
    ************* ***********

OBS=   63  AINP=  2  AOUT=  1  SKALA=  3
   86  1.000000000
  508  1.000000000
  509.  .356453452
  510   .646701330
  511.  .315580445
  512   .188134222
  286.  .619892314
 2508.  .406108208
 2509   .341281015
 2512.  .273750511
 2513. 1.000000000
 2514.  .094757586
 2515.  .152262789
 2517.  .562466691
 2518.  .113113969
 2519.  .389085104
 2520   .125151443
 2521.  .119713953
 2522   .139621248
 2523   .139255157
 2524    238081768
 2525   .515894388
 2527    302265660
 2528    053185133
  386.  .761605589
 3508   .903673426
 3511    346496164
```

113

3512.	.221295433
3513.	1.000000000
3514.	.109592229
3515.	.288262723
3516.	.095280641
3517.	.308223086
3518.	.061259734
3520.	.046869095
3521.	.121854325
3522.	.530062160
3524.	1.000000000
3526.	.522270962
3527.	.289245801
3529.	.979288818
3530.	.150738659
3531.	.169129182
3532.	.682347192
3533.	.151018568
486.	.943832956
4508.	.814601820
4511.	.218887256
4512.	.181974387
4513.	.357964678
4515.	.188605351
4516.	1.000000000
4517.	.215492341
4520.	1.000000000
4521.	.101082441
4522.	.351371793
4523.	.228622263
4524.	.317665457
4527.	.249172460
4532.	.304104930
4696.	.367616642
4698.	1.000000000
4726.	.249172460

STRUCT MEASURE= .74768

114

```
    OUTPUTMEASURE  INDUSTRY 60
    **************  ************


OBS=    3  AINP=  2  AOUT=  1  SKALA=  3
   87. 1.000000000
  287. 1.000000000
  487. 1.000000000

STRUCT.MEASURE=  .95936


    OUTPUTMEASURE  INDUSTRY 61
    **************  ************


OBS=    6  AINP=  2  AOUT=  1  SKALA=  3
   88.  .786060682
  534. 1.000000000
  288. 1.000000000
 2534. 1.000000000
 3534.  .862904825
 4534. 1.000000000

STRUCT.MEASURE=  .90238



    OUTPUTMEASURE  INDUSTRY 64
    **************  ************


OBS=   19  AINP=  2  AOUT=  1  SKALA=  3
   89   .440538951
   90  1.000000000
```

115

```
   91. 1.000000000
  538.  .385722855
  539. 1.000000000
  289. 1.000000000
  290.  .717460674
  291.  .592723145
 2538.  .539735926
 2539.  .046042545
 2540.  .074806425
 3539.  .791592785
 3541.  .684208561
 3542.  .176030043
  489.  .522874485
  491.  .596411100
 4539. 1.000000000
 4541. 1.000000000
 4542. 1.000000000

STRUCT.MEASURE=  .81954
```

```
    OUTPUTMEASURE  INDUSTRY 65
    **************  ************

OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
  543. 1.000000000
 2544. 1.000000000
 3543. 1.000000000
 4544. 1.000000000

STRUCT.MEASURE=  .99055
```

OUTPUTMEASURE INDUSTRY 66
********** **********

OBS= 17 AINP= 2 AOUT= 1 SKALA= 3

92.	.762202121
93.	1.000000000
545	.385549350
292.	.887298647
293.	.821149831
2545.	.609727100
2546.	.403468773
2547.	1.000000000
2548.	.272946657
2549	.701265607
3545.	.380083760
3547.	1.000000000
3549.	.862266781
3550.	1.000000000
3551.	.240483896
493.	1.000000000
4549.	.574181696

STRUCT.MEASURE= .88309

OUTPUTMEASURE INDUSTRY 67
********** **********

OBS= 19 AINP= 2 AOUT= 1 SKALA= 3

94	1 000000000
552	1.000000000
553	1.000000000
554.	1 000000000
555	163303282

117

```
 294    .403242563
2553.   .926047878
2554.    892320921
2556.   .138633870
2557.   .075305562
 394.   .934799717
3553.   .275337745
3555.   .141022213
3556.   .119409522
3557.   .082418101
3558.   .077352988
4553. 1.000000000
4555.   .200412847
4557. 1.000000000

STRUCT.MEASURE=  .84625
```

```
    OUTPUTMEASURE    INDUSTRY 68
    **************   ************

OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
   95. 1.000000000
  295. 1.000000000
  395. 1.000000000
  495.  .945534263

STRUCT.MEASURE=  .97335
```

118

```
    OUTPUTMEASURE  INDUSTRY 69
    **************  ************


OBS=   10  AINP=  2  AOUT=  1  SKALA=  3
   96. 1.000000000
  559. 1.000000000
  296.  .732264585
 2559.  .621125637
 2560. 1.000000000
  396. 1.000000000
 3559.  .652386769
 3560.  .276486668
  496. 1.000000000
 4560. 1.000000000

STRUCT.MEASURE=  .93980
```

```
    OUTPUTMEASURE  INDUSTRY 70
    **************  ************


OBS=    7  AINP=  2  AOUT=  1  SKALA=  3
 2561. 1.000000000
 2562.  .915629713
 3562.  .189332787
 3563. 1.000000000
 3564.  .464993992
 4562. 1.000000000
 4563. 1.000000000

STRUCT.MEASURE=  .92575
```

```
    OUTPUTMEASURE  INDUSTRY 73
    **************  ***********


OBS=   11  AINP=  2  AOUT=  1  SKALA=  3
   98.  .891160003
   99.  .892839136
  298.  .837231990
  299.  .682448928
 2100.  .582087551
 2565. 1.000000000
  398.  .941659582
 3100.  .626983743
 3566. 1.000000000
  498. 1.000000000
 4100. 1.000000000

STRUCT.MEASURE=  .86449


    OUTPUTMEASURE  INDUSTRY 74
    **************  ***********


OBS=    4  AINP=  2  AOUT=  1  SKALA=  3
 2567. 1.000000000
 2568. 1.000000000
 3568. 1.000000000
 4568. 1.000000000

STRUCT.MEASURE=  .95972
```

OUTPUTMEASURE INDUSTRY 75
********** **********

OBS= 5 AINP= 2 AOUT= 1 SKALA= 3

569.	1 000000000
570	1.000000000
2571.	.282244612
3571.	.545119960
3572	1.000000000

STRUCT.MEASURE= 85814

OUTPUTMEASURE INDUSTRY 78
********** **********

OBS= 108 AINP= 2 AOUT= 1 SKALA= 3

102.	1.000000000
574.	.639692140
575.	.158241145
576.	.210696290
577.	.482266666
2102.	.847092391
2103.	.119700683
2574.	.756643811
2576.	.508500257
2578.	.064164278
2579.	152039088
2580	.069438035
2581.	224190139
2582.	.058899587
2583	123951469
2584	.490074439
2585	.075558877
2586.	.162641728

2587.	.429131725
2588.	.089641827
2591.	.233414138
2592.	.301193538
2593.	.207713269
2594.	.457722782
2595.	.150022238
2596.	.086092236
2597.	.202432919
2598.	.159567734
2599.	1.000000000
2600.	.131342596
2601.	.629916236
2602.	.153375724
2603.	.460173279
2604.	.180122015
2605.	.310791953
2607.	.292674642
2608.	.123697690
2609.	.085190804
2610.	.231185786
2611.	.171825590
2614.	.472889159
2615.	.370757497
3103.	.224299874
3585.	.156151091
3587.	.140746619
3588.	.168740655
3589.	.078910596
3590.	.090400926
3591.	.347693948
3592.	.211165448
3594.	.331150350
3598.	.299804845
3600.	223592820
3601.	617283111
3602.	.394861960

122

3603.	.197667424
3605.	309397183
3606.	.435566801
3609.	.319122985
3611.	064498740
3612.	.519727166
3613.	.285335073
3614.	.088531597
3616.	.140761310
3617.	.128814812
3618.	1.000000000
3619.	1.000000000
3620.	.109886298
3621.	.187910198
3622.	.334964050
3623.	.780448556
3624.	.168298369
3625.	.178309378
3626.	.516458676
3627.	.232500900
3628.	.141116907
3629.	.111518745
3630.	.250989961
3631.	.113923940
3632.	.135905907
3633.	.120973198
3634.	.330615171
4576.	.174573579
4578.	.547533093
4580.	.257601007
4585.	1.000000000
4587.	.080450061
4588.	1.000000000
4591.	.108474072
4598.	.188421200
4600.	.241920954
4601.	623731699

```
 4605.  .153539893
 4606.  .418351702
 4610.  .267200567
 4612.  .125675052
 4617. 1.000000000
 4618.  .374433567
 4620.  .231153976
 4621.  .145372397
 4623.  .059552071
 4625.  .333224960
 4628.  .093194758
 4630.  .225045467
 4632.  .096089237
 4703.  .352804435
 4705.  .089761096
 4707. 1.000000000

STRUCT.MEASURE=  .67645
```

```
    OUTPUTMEASURE  INDUSTRY 79
    **************  ************

OBS=    5  AINP=  2  AOUT=  1  SKALA=  3
  635. 1.000000000
 2635.  .722277359
 2636. 1.000000000
 3635.  .316292362
 4635. 1.000000000

STRUCT.MEASURE=  .83826
```

OUTPUTMEASURE INDUSTRY 80

********** **********

OBS= 14 AINP= 2 AOUT= 1 SKALA= 3

104.	1.000000000
637	1.000000000
2104.	1.000000000
2637.	.748448369
2638.	.272233088
2639.	.930918429
3104.	.954919969
3637	.258847709
3638.	.246648123
3639.	1.000000000
4104.	.928285058
4638.	1.000000000
4639.	1.000000000
4713.	.839945393

STRUCT.MEASURE= .95541