

APPENDICE

Appendix A: Firm by firm results of VRS DEA model from DEAP Version 2.1

Results for firm: 1
 Technical efficiency = 0.832
 Scale efficiency = 0.965 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7488.000	0.000	0.000	7488.000
input 1	12480.000	-2091.573	0.000	10388.427
input 2	14.000	-2.346	-10.258	1.395
input 3	26.000	-4.357	-10.392	11.251
input 4	10000000.000	-1675940.162	0.000	8324059.838

LISTING OF PEERS:

peer	lambda	weight
19	0.020	
41	0.159	
65	0.820	

Results for firm: 2
 Technical efficiency = 0.806
 Scale efficiency = 0.990 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2400.000	0.000	0.000	2400.000
input 1	4799.000	-930.109	0.000	3868.891
input 2	25.000	-4.845	-15.144	5.011
input 3	12.000	-2.326	-0.035	9.639
input 4	1350000.000	-261647.729	0.000	1088352.271

LISTING OF PEERS:

peer	lambda	weight
19	0.049	
65	0.124	
28	0.827	

Results for firm: 3

Technical efficiency = 0.988

Scale efficiency = 0.956 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4540.000	0.000	0.000	4540.000
input 1	8266.000	-99.359	0.000	8166.641
input 2	3.000	-0.036	0.000	2.964
input 3	17.000	-0.204	-6.712	10.084
input 4	2000000.000	-24040.421	0.000	1975959.579

LISTING OF PEERS:

peer	lambda weight
37	0.051
11	0.861
19	0.060
48	0.028

Results for firm: 4

Technical efficiency = 0.995

Scale efficiency = 0.973 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2400.000	0.000	0.000	2400.000
input 1	4000.000	-18.040	0.000	3981.960
input 2	18.000	-0.081	-10.610	7.308
input 3	7.000	-0.032	0.000	6.968
input 4	1000000.000	-4510.066	0.000	995489.934

LISTING OF PEERS:

peer	lambda weight
33	0.009
7	0.932
65	0.034
19	0.025

Results for firm: 5
 Technical efficiency = 0.938
 Scale efficiency = 0.990 (irs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	2523.000	0.000	0.000	2523.000
input	1	4403.000	-272.654	0.000	4130.346
input	2	9.000	-0.557	-3.095	5.348
input	3	12.000	-0.743	-1.311	9.946
input	4	1055000.000	-65330.401	0.000	989669.599

LISTING OF PEERS:

peer	lambda	weight
19	0.056	
28	0.861	
65	0.083	

Results for firm: 6
 Technical efficiency = 0.959
 Scale efficiency = 0.949 (irs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	1670.000	0.000	0.000	1670.000
input	1	2880.000	-119.345	0.000	2760.655
input	2	2.000	-0.083	0.000	1.917
input	3	12.000	-0.497	-5.807	5.696
input	4	950000.000	-39367.154	0.000	910632.846

LISTING OF PEERS:

peer	lambda	weight
65	0.054	
28	0.051	
19	0.025	
8	0.870	

Results for firm: 7
 Technical efficiency = 1.000
 Scale efficiency = 0.901 (irs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	522.000	0.000	0.000	522.000
input	1	900.000	0.000	0.000	900.000
input	2	6.000	0.000	0.000	6.000
input	3	5.000	0.000	0.000	5.000
input	4	320000.000	0.000	0.000	320000.000

LISTING OF PEERS:

peer	lambda	weight
7	1.000	

Results for firm: 8
 Technical efficiency = 1.000
 Scale efficiency = 0.870 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	687.000	0.000	0.000	687.000
input 1	1200.000	0.000	0.000	1200.000
input 2	1.000	0.000	0.000	1.000
input 3	4.000	0.000	0.000	4.000
input 4	500000.000	0.000	0.000	500000.000

LISTING OF PEERS:
 peer lambda weight
 8 1.000

Results for firm: 9
 Technical efficiency = 0.923
 Scale efficiency = 0.938 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1375.000	0.000	0.000	1375.000
input 1	2500.000	-192.423	0.000	2307.577
input 2	2.000	-0.154	0.000	1.846
input 3	8.000	-0.616	-2.012	5.372
input 4	800000.000	-61575.357	0.000	738424.643

LISTING OF PEERS:
 peer lambda weight
 28 0.087
 65 0.027
 19 0.019
 8 0.868

Results for firm: 10
 Technical efficiency = 0.742
 Scale efficiency = 0.998 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2850.000	0.000	0.000	2850.000
input 1	5000.000	-1288.498	0.000	3711.502
input 2	12.000	-3.092	-7.336	1.571
input 3	39.000	-10.050	-20.768	8.182
input 4	4500000.000	-1159648.598	0.000	3340351.402

LISTING OF PEERS:
 peer lambda weight
 19 0.008
 28 0.207
 65 0.785

Results for firm: 11

Technical efficiency = 1.000

Scale efficiency = 0.861 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	825.000	0.000	0.000	825.000
input 1	1500.000	0.000	0.000	1500.000
input 2	1.000	0.000	0.000	1.000
input 3	6.000	0.000	0.000	6.000
input 4	500000.000	0.000	0.000	500000.000

LISTING OF PEERS:

peer lambda weight
11 1.000

Results for firm: 12

Technical efficiency = 0.995

Scale efficiency = 0.953 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1152.000	0.000	0.000	1152.000
input 1	2020.000	-9.729	0.000	2010.271
input 2	13.000	-0.063	-6.182	6.755
input 3	7.000	-0.034	0.000	6.966
input 4	350000.000	-1685.703	0.000	348314.297

LISTING OF PEERS:

peer lambda weight
23 0.037
7 0.467
19 0.004
28 0.492

Results for firm: 13

Technical efficiency = 0.875

Scale efficiency = 0.984 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	24750.000	0.000	0.000	24750.000
input 1	45000.000	-5606.815	0.000	39393.185
input 2	0.000	-8.722	-44.573	16.705
input 3	53.000	-6.604	-10.477	35.919
input 4	15000000.000	-1868938.446	0.000	13131061.554

LISTING OF PEERS:

peer lambda weight
19 0.491
65 0.269
41 0.239

Results for firm: 14

Technical efficiency = 0.685

Scale efficiency = 0.877 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	750.000	0.000	0.000	750.000
input 1	1560.000	-491.624	0.000	1068.376
input 2	14.000	-4.412	-6.137	3.451
input 3	30.000	-9.454	-13.383	7.162
input 4	1000000.000	-3151435.459	-6094444.883	754119.658

LISTING OF PEERS:

peer lambda weight

28 0.838

65 0.162

Results for firm: 15

Technical efficiency = 0.789

Scale efficiency = 0.983 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	21000.000	0.000	0.000	21000.000
input 1	42000.000	-8841.334	0.000	33158.666
input 2	24.000	-5.052	-5.322	13.626
input 3	62.000	-13.051	-18.154	30.794
input 4	1500000.000	-3157619.242	0.000	11842380.758

LISTING OF PEERS:

peer lambda weight

19 0.397

41 0.211

65 0.392

Results for firm: 16

Technical efficiency = 0.850

Scale efficiency = 0.949 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1000.000	0.000	0.000	1000.000
input 1	2000.000	-299.155	0.000	1700.845
input 2	4.000	-0.598	0.000	3.402
input 3	12.000	-1.795	-3.422	6.783
input 4	500000.000	-74788.723	0.000	425211.277

LISTING OF PEERS:

peer lambda weight

19 0.016

28 0.634

65 0.008

8 0.342

Results for firm: 17

Technical efficiency = 0.805

Scale efficiency = 0.989 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2600.000	0.000	0.000	2600.000
input 1	5470.000	-1065.116	0.000	4404.884
input 2	25.000	-4.868	-13.531	6.601
input 3	17.000	-3.310	-3.481	10.208
input 4	876000.000	-170574.327	0.000	705425.673

LISTING OF PEERS:

peer	lambda	weight
23	0.022	
19	0.055	
28	0.923	

Results for firm: 18

Technical efficiency = 0.979

Scale efficiency = 0.982 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	21600.000	0.000	0.000	21600.000
input 1	36000.000	-769.473	0.000	35230.527
input 2	8.000	-0.171	0.000	7.829
input 3	39.000	-0.834	-11.097	27.070
input 4	15000000.000	-320613.651	0.000	14679386.349

LISTING OF PEERS:

peer	lambda	weight
37	0.133	
19	0.207	
41	0.198	
48	0.462	

Results for firm: 19

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	36000.000	0.000	0.000	36000.000
input 1	60000.000	0.000	0.000	60000.000
input 2	33.000	0.000	0.000	33.000
input 3	58.000	0.000	0.000	58.000
input 4	10000000.000	0.000	0.000	10000000.000

LISTING OF PEERS:

peer	lambda	weight
19	1.000	

Results for firm: 20

Technical efficiency = 0.821

Scale efficiency = 0.913 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7920.000	0.000	0.000	7920.000
input 1	13200.000	-2357.248	0.000	10842.752
input 2	20.000	-3.572	-15.657	0.772
input 3	53.000	-9.465	-32.624	10.911
input 4	15000000.000	-2678690.429	-2878631.157	9442678.414

LISTING OF PEERS:

peer	lambda	weight
65	0.792	
41	0.208	

Results for firm: 21

Technical efficiency = 0.805

Scale efficiency = 0.947 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1830.000	0.000	0.000	1830.000
input 1	3000.000	-583.844	0.000	2416.156
input 2	17.000	-3.308	-10.407	3.285
input 3	8.000	-1.557	0.000	6.443
input 4	8900000.000	-1732069.646	-4989033.963	2178896.391

LISTING OF PEERS:

peer	lambda	weight
65	0.487	
7	0.494	
8	0.019	

Results for firm: 22

Technical efficiency = 0.725

Scale efficiency = 0.974 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1977.000	0.000	0.000	1977.000
input 1	3500.000	-963.419	0.000	2536.581
input 2	30.000	-8.258	-19.709	2.033
input 3	32.000	-8.808	-15.610	7.582
input 4	15000000.000	-4128937.729	-8427248.254	2443814.017

LISTING OF PEERS:

peer	lambda	weight
28	0.418	
65	0.582	

Results for firm: 23

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	17100.000	0.000	0.000	17100.000
input 1	30000.000	0.000	0.000	30000.000
input 2	40.000	0.000	0.000	40.000
input 3	26.000	0.000	0.000	26.000
input 4	3000000.000	0.000	0.000	3000000.000

LISTING OF PEERS:

peer	lambda weight
23	1.000

Results for firm: 24

Technical efficiency = 0.723

Scale efficiency = 0.973 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4032.000	0.000	0.000	4032.000
input 1	7200.000	-1993.820	0.000	5206.180
input 2	4.000	-1.108	-2.246	0.647
input 3	14.000	-3.877	-1.610	8.513
input 4	12000000.000	-3323033.186	-3612142.144	5064824.670

LISTING OF PEERS:

peer	lambda weight
65	0.963
41	0.037

Results for firm: 25

Technical efficiency = 0.742

Scale efficiency = 0.982 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	9250.000	0.000	0.000	9250.000
input 1	18500.000	-4771.752	0.000	13728.248
input 2	20.000	-5.159	-10.477	4.364
input 3	44.000	-11.349	-17.546	15.105
input 4	10000000.000	-2579325.237	0.000	7420674.763

LISTING OF PEERS:

peer	lambda weight
19	0.113
41	0.103
65	0.784

Results for firm: 26
 Technical efficiency = 0.890
 Scale efficiency = 0.995 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3600.000	0.000	0.000	3600.000
input 1	6000.000	-657.669	0.000	5342.331
input 2	20.000	-2.192	-13.755	4.053
input 3	11.000	-1.206	0.000	9.794
input 4	3000000.000	-328834.429	0.000	2671165.571

LISTING OF PEERS:

peer	lambda weight
7	0.147
19	0.051
65	0.506
28	0.296

Results for firm: 27
 Technical efficiency = 0.847
 Scale efficiency = 0.994 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2850.000	0.000	0.000	2850.000
input 1	5000.000	-766.812	0.000	4233.188
input 2	40.000	-6.134	-30.106	3.760
input 3	21.000	-3.221	-8.389	9.390
input 4	2500000.000	-383405.956	0.000	2116594.044

LISTING OF PEERS:

peer	lambda weight
19	0.039
65	0.405
28	0.556

Results for firm: 28
 Technical efficiency = 1.000
 Scale efficiency = 0.905 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	275.000	0.000	0.000	275.000
input 1	500.000	0.000	0.000	500.000
input 2	4.000	0.000	0.000	4.000
input 3	7.000	0.000	0.000	7.000
input 4	100000.000	0.000	0.000	100000.000

LISTING OF PEERS:

peer	lambda weight
28	1.000

Results for firm: 29

Technical efficiency = 0.818

Scale efficiency = 0.995 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	5700.000	0.000	0.000	5700.000
input 1	10000.000	-1821.834	0.000	8178.166
input 2	8.000	-1.457	-3.789	2.754
input 3	26.000	-4.737	-9.770	11.493
input 4	6000000.000	-1093100.230	0.000	4906899.770

LISTING OF PEERS:

peer	lambda weight
19	0.066
41	0.015
65	0.919

Results for firm: 30

Technical efficiency = 0.912

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7200.000	0.000	0.000	7200.000
input 1	12000.000	-1050.583	0.000	10949.417
input 2	20.000	-1.751	-13.176	5.073
input 3	24.000	-2.101	-7.523	14.376
input 4	5000000.000	-437743.057	0.000	4562256.943

LISTING OF PEERS:

peer	lambda weight
19	0.129
65	0.790
28	0.080

Results for firm: 31

Technical efficiency = 0.640

Scale efficiency = 0.993 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	20500.000	0.000	0.000	20500.000
input 1	50000.000	-18012.110	0.000	31987.890
input 2	13.000	-4.683	0.000	8.317
input 3	29.000	-10.447	0.000	18.553
input 4	25000000.000	-9006054.841	0.000	15993945.159

LISTING OF PEERS:

peer	lambda weight
8	0.312
37	0.042
33	0.072
48	0.227
41	0.347

Results for firm: 32
 Technical efficiency = 0.769
 Scale efficiency = 0.984 (drs)
 PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	6050.000	0.000	0.000	6050.000
input	1	11000.000	-2545.095	0.000	8454.905
input	2	3.000	-0.694	-0.396	1.910
input	3	41.000	-9.486	-20.617	10.896
input	4	8000000.000	-1850978.068	0.000	6149021.932

LISTING OF PEERS:

peer	lambda	weight
41	0.070	
19	0.038	
65	0.891	

Results for firm: 33
 Technical efficiency = 1.000
 Scale efficiency = 1.000 (crs)
 PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	103680.000	0.000	0.000	103680.000
input	1	172800.000	0.000	0.000	172800.000
input	2	40.000	0.000	0.000	40.000
input	3	67.000	0.000	0.000	67.000
input	4	35000000.000	0.000	0.000	35000000.000

LISTING OF PEERS:

peer	lambda	weight
33	1.000	

Results for firm: 34
 Technical efficiency = 0.922
 Scale efficiency = 0.972 (irs)
 PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	3600.000	0.000	0.000	3600.000
input	1	6000.000	-470.959	0.000	5529.041
input	2	2.000	-0.157	0.000	1.843
input	3	12.000	-0.942	-1.810	9.248
input	4	3000000.000	-235479.455	0.000	2764520.545

LISTING OF PEERS:

peer	lambda	weight
65	0.247	
19	0.029	
11	0.620	
48	0.105	

Results for firm: 35
 Technical efficiency = 0.843
 Scale efficiency = 0.945 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	14400.000	0.000	0.000	14400.000
input 1	24000.000	-3762.960	0.000	20237.040
input 2	26.000	-4.077	-20.943	0.980
input 3	32.000	-5.017	-12.075	14.907
input 4	25000000.000	-3919750.367	-4341148.311	16739101.322

LISTING OF PEERS:

peer	lambda weight
41	0.493
65	0.507

Results for firm: 36
 Technical efficiency = 0.872
 Scale efficiency = 0.983 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	1346.000	0.000	0.000	1346.000
input 1	2300.000	-293.399	0.000	2006.601
input 2	10.000	-1.276	-5.018	3.707
input 3	14.000	-1.786	-4.327	7.887
input 4	1200000.000	-153077.710	0.000	1046922.290

LISTING OF PEERS:

peer	lambda weight
19	0.013
65	0.202
28	0.785

Results for firm: 37
 Technical efficiency = 1.000
 Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	25920.000	0.000	0.000	25920.000
input 1	54000.000	0.000	0.000	54000.000
input 2	1.580	0.000	0.000	1.580
input 3	18.000	0.000	0.000	18.000
input 4	12480000.000	0.000	0.000	12480000.000

LISTING OF PEERS:

peer	lambda weight
37	1.000

Results for firm: 38
 Technical efficiency = 0.816
 Scale efficiency = 0.996 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	11700.000	0.000	0.000	11700.000
input 1	20000.000	-3677.247	0.000	16322.753
input 2	4.500	-0.827	-2.779	0.893
input 3	17.000	-3.126	-0.632	13.242
input 4	18288000.000	-3362474.379	-1226600.511	13698925.110

LISTING OF PEERS:

peer	lambda	weight
41	0.374	
65	0.626	

Results for firm: 39
 Technical efficiency = 0.695
 Scale efficiency = 0.899 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2000.000	0.000	105.525	2105.525
input 1	4000.000	-1219.471	0.000	2780.529
input 2	1.130	-0.345	0.000	0.785
input 3	14.000	-4.268	-3.474	6.258
input 4	9024000.000	-2751125.534	-3724959.863	2547914.603

LISTING OF PEERS:

peer	lambda	weight
65	0.564	
8	0.436	

Results for firm: 40
 Technical efficiency = 0.900
 Scale efficiency = 0.978 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	6030.000	0.000	0.000	6030.000
input 1	9000.000	-897.248	0.000	8102.752
input 2	3.450	-0.344	-2.395	0.711
input 3	13.000	-1.296	-1.959	9.745
input 4	15540000.000	-1549248.244	-6676196.690	7314555.066

LISTING OF PEERS:

peer	lambda	weight
65	0.875	
41	0.125	

Results for firm: 41

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	25900.000	0.000	0.000	25900.000
input 1	36909.000	0.000	0.000	36909.000
input 2	1.350	0.000	0.000	1.350
input 3	22.000	0.000	0.000	22.000
input 4	29688000.000	0.000	0.000	29688000.000

LISTING OF PEERS:

peer	lambda	weight
41	1.000	

Results for firm: 42

Technical efficiency = 0.871

Scale efficiency = 0.933 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	5850.000	0.000	0.000	5850.000
input 1	9000.000	-1158.200	0.000	7841.800
input 2	6.610	-0.851	-5.054	0.705
input 3	38.000	-4.890	-23.475	9.634
input 4	18000000.000	-2316400.881	-8571722.467	7111876.652

LISTING OF PEERS:

peer	lambda	weight
65	0.883	
41	0.117	

Results for firm: 43

Technical efficiency = 0.886

Scale efficiency = 0.951 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7345.000	0.000	0.000	7345.000
input 1	11300.000	-1290.846	0.000	10009.154
input 2	33.040	-3.774	-28.512	0.753
input 3	18.000	-2.056	-5.387	10.556
input 4	18600000.000	-2124754.696	-7680011.824	8795233.480

LISTING OF PEERS:

peer	lambda	weight
65	0.817	
41	0.183	

Results for firm: 44
 Technical efficiency = 0.883
 Scale efficiency = 0.997 (drs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	5540.000	0.000	0.000	5540.000
input 1	8370.000	-977.619	0.000	7392.381
input 2	13.500	-1.577	-11.228	0.695
input 3	11.000	-1.285	-0.272	9.443
input 4	15600000.000	-1822084.664	-7015095.953	6762819.383

LISTING OF PEERS:

peer	lambda	weight
65	0.897	
41	0.103	

Results for firm: 45
 Technical efficiency = 0.868
 Scale efficiency = 0.950 (drs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4763.000	0.000	0.000	4763.000
input 1	7218.000	-952.063	0.000	6265.937
input 2	6.610	-0.872	-5.068	0.670
input 3	16.000	-2.110	-4.926	8.964
input 4	11802960.000	-1556825.023	-4358210.748	5887924.229

LISTING OF PEERS:

peer	lambda	weight
65	0.931	
41	0.069	

Results for firm: 46
 Technical efficiency = 0.902
 Scale efficiency = 0.970 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4020.000	0.000	0.000	4020.000
input 1	6000.000	-585.066	0.000	5414.934
input 2	0.680	-0.066	0.000	0.614
input 3	9.000	-0.878	0.000	8.122
input 4	12300000.000	-1199384.702	-5254237.225	5846378.073

LISTING OF PEERS:

peer	lambda	weight
65	0.766	
41	0.027	
62	0.190	
8	0.017	

Results for firm: 47
 Technical efficiency = 1.000
 Scale efficiency = 0.868 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3960.000	0.000	0.000	3960.000
input 1	6380.000	0.000	0.000	6380.000
input 2	2.250	0.000	0.000	2.250
input 3	5.000	0.000	0.000	5.000
input 4	8340000.000	0.000	0.000	8340000.000

LISTING OF PEERS:
 peer lambda weight
 47 1.000

Results for firm: 48
 Technical efficiency = 1.000
 Scale efficiency = 1.000 (crs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	12060.000	0.000	0.000	12060.000
input 1	18000.000	0.000	0.000	18000.000
input 2	1.130	0.000	0.000	1.130
input 3	18.000	0.000	0.000	18.000
input 4	10980000.000	0.000	0.000	10980000.000

LISTING OF PEERS:
 peer lambda weight
 48 1.000

Results for firm: 49
 Technical efficiency = 0.935
 Scale efficiency = 0.977 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	6000.000	0.000	0.000	6000.000
input 1	9100.000	-588.421	0.000	8511.579
input 2	5.600	-0.362	-3.032	2.205
input 3	8.000	-0.517	0.000	7.483
input 4	25092000.000	-1622489.672	-14259734.315	9209776.013

LISTING OF PEERS:
 peer lambda weight
 65 0.277
 41 0.097
 63 0.626

Results for firm: 50

Technical efficiency = 0.926

Scale efficiency = 0.900 (irs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	1531.000	0.000	0.000	1531.000
input	1	2296.000	-169.883	0.000	2126.117
input	2	1.130	-0.084	0.000	1.046
input	3	8.000	-0.592	-1.848	5.560
input	4	10440000.000	-772462.460	-7937521.739	1730015.801

LISTING OF PEERS:

peer lambda weight

65 0.346

8 0.595

28 0.059

Results for firm: 51

Technical efficiency = 0.863

Scale efficiency = 0.968 (drs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	6392.000	0.000	0.000	6392.000
input	1	10000.000	-1372.444	0.000	8627.556
input	2	18.750	-2.573	-15.454	0.723
input	3	15.000	-2.059	-2.973	9.969
input	4	35484000.000	-4869979.227	-22891856.897	7722163.877

LISTING OF PEERS:

peer lambda weight

65 0.859

41 0.141

Results for firm: 52

Technical efficiency = 0.920

Scale efficiency = 0.978 (irs)

PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	5824.000	0.000	0.000	5824.000
input	1	8850.000	-703.874	0.000	8146.126
input	2	2.250	-0.179	-0.723	1.348
input	3	9.000	-0.716	0.000	8.284
input	4	8280000.000	-658539.694	0.000	7621460.306

LISTING OF PEERS:

peer lambda weight

41 0.129

65 0.432

63 0.229

8 0.209

Results for firm: 53

Technical efficiency = 0.852

Scale efficiency = 0.998 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3060.000	0.000	0.000	3060.000
input 1	4500.000	-667.521	0.000	3832.479
input 2	1.130	-0.168	-0.181	0.782
input 3	11.000	-1.632	-1.416	7.952
input 4	12960000.000	-1922461.538	-7102331.624	3935206.838

LISTING OF PEERS:

peer lambda weight

65 0.952

28 0.048

Results for firm: 54

Technical efficiency = 1.000

Scale efficiency = 0.950 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7240.000	0.000	0.000	7240.000
input 1	10800.000	0.000	0.000	10800.000
input 2	3.720	0.000	0.000	3.720
input 3	7.000	0.000	0.000	7.000
input 4	12000000.000	0.000	0.000	12000000.000

LISTING OF PEERS:

peer lambda weight

54 1.000

Results for firm: 55

Technical efficiency = 0.958

Scale efficiency = 0.970 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	5360.000	0.000	0.000	5360.000
input 1	8000.000	-338.771	0.000	7661.229
input 2	4.500	-0.191	-1.868	2.441
input 3	7.000	-0.296	0.000	6.704
input 4	13656000.000	-578282.005	-4258145.103	8819572.892

LISTING OF PEERS:

peer lambda weight

41 0.064

63 0.733

65 0.202

Results for firm: 56

Technical efficiency = 0.783

Scale efficiency = 0.990 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3410.000	0.000	0.000	3410.000
input 1	5500.000	-1195.556	0.000	4304.444
input 2	3.470	-0.754	-2.089	0.627
input 3	24.000	-5.217	-10.654	8.130
input 4	46080000.000	-10016581.408	-31698960.442	4364458.150

LISTING OF PEERS:

peer lambda weight

41 0.009

65 0.991

Results for firm: 57

Technical efficiency = 1.000

Scale efficiency = 0.946 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	11220.000	0.000	0.000	11220.000
input 1	17000.000	0.000	0.000	17000.000
input 2	1.410	0.000	0.000	1.410
input 3	10.000	0.000	0.000	10.000
input 4	28836000.000	0.000	0.000	28836000.000

LISTING OF PEERS:

peer lambda weight

57 1.000

Results for firm: 58

Technical efficiency = 0.893

Scale efficiency = 0.940 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	6600.000	0.000	0.000	6600.000
input 1	10000.000	-1070.899	0.000	8929.101
input 2	1.800	-0.193	-0.878	0.729
input 3	18.000	-1.928	-5.975	10.097
input 4	17676000.000	-1892920.504	-7826709.452	7956370.044

LISTING OF PEERS:

peer lambda weight

65 0.850

41 0.150

Results for firm: 59
 Technical efficiency = 0.858
 Scale efficiency = 0.991 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3400.000	0.000	0.000	3400.000
input 1	5000.000	-710.053	0.000	4289.947
input 2	1.580	-0.224	-0.729	0.626
input 3	15.000	-2.130	-4.746	8.123
input 4	18480000.000	-2624355.383	-11502446.379	4353198.238

LISTING OF PEERS:

peer	lambda weight
65	0.991
41	0.009

Results for firm: 60
 Technical efficiency = 0.950
 Scale efficiency = 0.987 (drs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	27600.000	0.000	0.000	27600.000
input 1	42000.000	-2120.896	0.000	39879.104
input 2	5.070	-0.256	-1.308	3.506
input 3	25.000	-1.262	-0.754	22.984
input 4	79863796.000	-4032923.674	-46026770.500	29804101.826

LISTING OF PEERS:

peer	lambda weight
33	0.022
41	0.978

Results for firm: 61
 Technical efficiency = 1.000
 Scale efficiency = 0.832 (irs)

PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3311.000	0.000	0.000	3311.000
input 1	5500.000	0.000	0.000	5500.000
input 2	1.350	0.000	0.000	1.350
input 3	5.000	0.000	0.000	5.000
input 4	14568000.000	0.000	0.000	14568000.000

LISTING OF PEERS:

peer	lambda weight
61	1.000

Results for firm: 62
 Technical efficiency = 1.000
 Scale efficiency = 0.887 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4500.000	0.000	0.000	4500.000
input 1	7000.000	0.000	0.000	7000.000
input 2	0.450	0.000	0.000	0.450
input 3	7.000	0.000	0.000	7.000
input 4	9840000.000	0.000	0.000	9840000.000

LISTING OF PEERS:
 peer lambda weight
 62 1.000

Results for firm: 63
 Technical efficiency = 1.000
 Scale efficiency = 0.948 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	4150.000	0.000	0.000	4150.000
input 1	6100.000	0.000	0.000	6100.000
input 2	3.040	0.000	0.000	3.040
input 3	5.000	0.000	0.000	5.000
input 4	8280000.000	0.000	0.000	8280000.000

LISTING OF PEERS:
 peer lambda weight
 63 1.000

Results for firm: 64
 Technical efficiency = 0.855
 Scale efficiency = 0.979 (drs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3685.000	0.000	0.000	3685.000
input 1	5500.000	-796.878	0.000	4703.122
input 2	3.750	-0.543	-2.571	0.636
input 3	12.000	-1.739	-1.962	8.299
input 4	12120000.000	-1756029.765	-5689864.508	4674105.727

LISTING OF PEERS:
 peer lambda weight
 65 0.979
 41 0.021

Results for firm: 65
 Technical efficiency = 1.000
 Scale efficiency = 1.000 (crs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3200.000	0.000	0.000	3200.000
input 1	4000.000	0.000	0.000	4000.000
input 2	0.620	0.000	0.000	0.620
input 3	8.000	0.000	0.000	8.000
input 4	4128000.000	0.000	0.000	4128000.000

LISTING OF PEERS:
 peer lambda weight
 65 1.000

Results for firm: 66
 Technical efficiency = 0.994
 Scale efficiency = 0.889 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2176.000	0.000	0.000	2176.000
input 1	3200.000	-18.155	0.000	3181.845
input 2	3.300	-0.019	-1.712	1.569
input 3	5.000	-0.028	0.000	4.972
input 4	10800000.000	-61272.035	-7227314.201	3511413.765

LISTING OF PEERS:
 peer lambda weight
 8 0.525
 65 0.165
 63 0.310

Results for firm: 67
 Technical efficiency = 0.846
 Scale efficiency = 0.998 (drs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	3818.000	0.000	0.000	3818.000
input 1	5785.000	-889.063	0.000	4895.937
input 2	1.350	-0.207	-0.503	0.640
input 3	10.000	-1.537	-0.082	8.381
input 4	12000000.000	-1844210.921	-5331926.524	4823862.555

LISTING OF PEERS:
 peer lambda weight
 65 0.973
 41 0.027

Results for firm: 68
 Technical efficiency = 0.865
 Scale efficiency = 0.986 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2388.000	0.000	0.000	2388.000
input 1	3500.000	-471.624	0.000	3028.376
input 2	7.170	-0.966	-4.646	1.558
input 3	10.000	-1.347	-0.930	7.722
input 4	10224000.000	-1377680.879	-5836519.463	3009799.658

LISTING OF PEERS:
 peer lambda weight
 65 0.722
 28 0.278

Results for firm: 69
 Technical efficiency = 1.000
 Scale efficiency = 0.906 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	7560.000	0.000	0.000	7560.000
input 1	12000.000	0.000	0.000	12000.000
input 2	6.610	0.000	0.000	6.610
input 3	7.000	0.000	0.000	7.000
input 4	12000000.000	0.000	0.000	12000000.000

LISTING OF PEERS:
 peer lambda weight
 69 1.000

Results for firm: 70
 Technical efficiency = 0.674
 Scale efficiency = 0.991 (irs)
 PROJECTION SUMMARY:

variable	original value	radial movement	slack value	projected
output 1	2913.000	0.000	0.000	2913.000
input 1	5452.000	-1777.618	0.000	3674.382
input 2	1.090	-0.355	0.000	0.735
input 3	14.000	-4.565	-1.804	7.632
input 4	17586000.000	-5733892.756	-8133725.175	3718382.069

LISTING OF PEERS:
 peer lambda weight
 65 0.890
 28 0.024
 8 0.086

Results for firm: 71
 Technical efficiency = 0.860
 Scale efficiency = 0.983 (drs)
 PROJECTION SUMMARY:

variable		original value	radial movement	slack value	projected
output	1	4000.000	0.000	0.000	4000.000
input	1	6000.000	-840.211	0.000	5159.789
input	2	16.500	-2.311	-13.544	0.646
input	3	11.000	-1.540	-0.966	8.493
input	4	10344000.000	-1448524.546	-3866682.502	5028792.952

LISTING OF PEERS:

peer	lambda	weight
65	0.965	
41	0.035	

Appendix B: Tobit regression results of source of technical inefficiency in rice mill in Thailand and Taiwan from LIMDEP version 7.0

```
--> READ;file="D:\Public\Nuna\NunaThesis\Thesis data\tobitTH.xls";format=xls...
--> TOBIT;Lhs=VRS;Rhs=ONE,YR,CAPACITY,EXP,EDU,ENERGY,TYPE$
```

```
+-----+
| Limited Dependent Variable Model - CENSORED Regression
| Ordinary least squares regression Weighting variable = none
| Dep. var. = VRS Mean= .874722222 , S.D.= .1062134269
| Model size: Observations = 36, Parameters = 7, Deg.Fr.= 29
| Residuals: Sum of squares= 1.044363636 , Std.Dev.= .18658
| Fit: R-squared=-1.644995, Adjusted R-squared = -2.08583
| Model test: F[ 6, 29] = 12.96, Prob value = .04704
| Diagnostic: Log-L = 12.6402, Restricted(b=0) Log-L = 30.1483
| LogAmemiyaPrCrt.= -3.204, Akaike Info. Crt.= -.369
+-----+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[Z >z]	Mean of X
Constant	.8313605145	.10811210	7.690	.0000	
YR	-.4268777605E-02	.39013731E-02	-1.094	.2739	14.722222
CAPACITY	-.6529927342E-04	.27423825E-03	-.238	.8118	101.16667
EXP	.1636053395E-01	.39727188E-02	4.118	.0000	18.194444
EDU	.1409224877	.24934437E-01	5.652	.0000	2.8611111
ENERGY	.1285734232E-01	.36314187E-01	.354	.7233	1.8888889
TYPE	.2133924255	.11804406	1.808	.0706	.91666667

Normal exit from iterations. Exit status=0.

```
+-----+
| Limited Dependent Variable Model - CENSORED
| Maximum Likelihood Estimates
| Dependent variable VRS
| Weighting variable ONE
| Number of observations 36
| Iterations completed 4
| Log likelihood function 12.64022
| Threshold values for the model:
| Lower= .0000 Upper=+infinity
+-----+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[Z >z]	Mean of X
Primary Index Equation for Model					
Constant	.8313605145	.97033581E-01	8.568	.0000	
YR	-.4268777605E-02	.35614501E-02	-1.199	.2307	14.722222
CAPACITY	-.6529927342E-04	.25034412E-03	-.261	.7942	101.16667
EXP	.1636053395E-01	.36265795E-02	4.511	.0000	18.194444
EDU	.1409224877	.22761923E-01	6.191	.0000	2.8611111
ENERGY	.1285734232E-01	.33150166E-01	.388	.6981	1.8888889
TYPE	.2133924255	.10775899	1.980	.0477	.91666667
Disturbance standard deviation					
Sigma	.1703235186	.20072819E-01	8.485	.0000	

```
--> READ;file="D:\Public\Nuna\NunaThesis\Thesis
data\tobitTW.xls";format=xls...
--> TOBIT;Lhs=CRS;Rhs=ONE,YR,CAPACITY,EXP,EDU,ENERGY,TYPE$
```

```
-----+-----+-----+-----+-----+-----+
| Limited Dependent Variable Model - CENSORED Regression
| Ordinary least squares regression Weighting variable = none
| Dep. var. = VRS Mean= .9100857143 , S.D.= .8624396703E-01
| Model size: Observations = 35, Parameters = 7, Deg.Fr. = 28
| Residuals: Sum of squares= 1.136706876 , Std.Dev.= .19798
| Fit: R-squared=-3.494818, Adjusted R-squared = -4.26979
| Model test: F[ 6, 28] = 15.48, Prob value = .05376
| Diagnostic: Log-L = 10.3134, Restricted(b=0) Log-L = 36.6146
| LogAmemiyaPrCrt.= -3.081, Akaike Info. Crt.= -.246
|-----+-----+-----+-----+-----+-----+

```

Variable	Coefficient	Standard Error	b/St.Er.	P[Z >z]	Mean of X
Constant	.8868337139	.86296640E-01	10.277	.0000	
YR	.3911694640E-02	.25642523E-02	1.525	.1271	25.542857
CAPACITY	-.1445758858E-04	.21632959E-03	-.067	.9467	91.800000
EXP	.8820874043E-02	.27135965E-02	3.251	.0012	20.885714
EDU	.1499626326	.28790659E-01	5.209	.0000	2.7142857
ENERGY	.2800682579E-01	.23477063E-01	1.193	.2329	2.2857143
TYPE	.1484733158	.98606914E-01	1.506	.1321	.85714286

Normal exit from iterations. Exit status=0.

```
-----+-----+-----+-----+-----+-----+
| Limited Dependent Variable Model - CENSORED
| Maximum Likelihood Estimates
| Dependent variable VRS
| Weighting variable ONE
| Number of observations 35
| Iterations completed 4
| Log likelihood function 10.31337
| Threshold values for the model:
| Lower= .0000 Upper=+infinity
|-----+-----+-----+-----+-----+-----+

```

Variable	Coefficient	Standard Error	b/St.Er.	P[Z >z]	Mean of X
Primary Index Equation for Model					
Constant	.8868337139	.77186061E-01	11.490	.0000	
YR	.3911694640E-02	.23341337E-02	1.676	.0938	25.542857
CAPACITY	-.1445758858E-04	.19691595E-03	-.073	.9415	91.800000
EXP	.8820874043E-02	.24700756E-02	3.571	.0004	20.885714
EDU	.1499626326	.26206956E-01	5.722	.0000	2.7142857
ENERGY	.2800682579E-01	.21370208E-01	1.311	.1900	2.2857143
TYPE	.1484733158	.89757830E-01	1.654	.0981	.85714286
Disturbance standard deviation					
Sigma	.1802147034	.21539777E-01	8.367	.0000	

CURRICULUM VITAE

Name : Miss Jantana Wongkeawchan

Date of Birth : May 16, 1977

Place of Birth : Bangkok, Thailand

Education Background:

1995 – 1998

B.Sc. Statistics

Faculty of Science

Chiang Mai University, Thailand

1999 – 2002

M.S. Agriculture (Agricultural Systems)

Faculty of Agriculture

Chiang Mai University, Thailand

Academic Activities and Job Experiences:

2000

Supporting Staff for ADB 33rd Annual Meeting, Chiang
Mai, Thailand

2000

Supporting Staff for International Symposium of
Agribusiness Management towards Strengthening
Agricultural Development and Trade, Chiang Mai,
Thailand

2001

Student Exchange, National Chung Hsing, Taichung,
Taiwan

- 2002 Supporting Staff for National Agricultural Fair 3rd,
Chiang Mai University, Chiang Mai, Thailand
- 2002 Supporting Staff Sustainable Farming at the Rural-
Urban Interface (RURBIFARM) workshop and training,
Chiang Mai, Thailand March 9-19, 2003

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Chiang Mai University