

\$online

/*

GAMS program used to estimate input oriented technical efficiency.

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This version will estimate technical efficiency for each DMU, based on an input oriented constant returns to scale DEA model.

References: Fare, R, S. Grosskopf and C.A. Knox Lovell. 1994. Production Frontiers. Cambridge university Press.

Olesen, O.B. and N.C. Petersen. 1996. A Presentation of GAMS for DEA. Computers and Operations Research, Vol. 23, NO. 4, pp 323-339.

*/

/ The following line turns off listing of some elements in the GAMS listing file*/*

\$OFFSYMLIST OFFSYMREF OFFUELLIST OFFUELXREF

OPTION SYSOUT=OFF, LIMROW=0, LIMCOL=0;

*/*NEXT DEFINE INPUTS AND OUTPUTS*/*

SET INOUT /y1*y3, x1*x5/
OUTPUT(INOUT) /y1*y3/
INPUT(INOUT) /x1*x5/

OBS /1*200/

SUBOBS(OBS) /1*50/

ACTOBS(OBS)

*/*We have allocated enough memory for 200 observations, but our data set only contains 50 observations (subobs)*/*

;

*/*Next, define an alias for the set SUBOBS */*

alias (subobs, subobs1)

/ The include statement below reads in an external data file which contains a table of observations, inputs and outputs. The files is in comma separated value format (CSV) which can be written from, and read into spreadsheet programs*

The offlisting command means that the data won't be included in the listing file.

*/

\$OFFLISTING

TABLE ACT(OBS,INOUT) INPUT OUTPUT TABLE

\$ondelim

\$INCLUDE "data_test.csv"

\$offdelim

\$ONLISTING

VARIABLES

lambda efficiency score
weight(obs) weights;

POSITIVE Variable weight;

EQUATIONS

CONSTR1(OUTPUT, OBS) DEA constraint for each output
CONSTR2(INPUT, OBS) DEA constraint for each input;

CONSTR1(OUTPUT, ACTOBS).. SUM(SUBOBS, WEIGHT(SUBOBS)*ACT(SUBOBS,OUTPUT)) =G=
ACT(ACTOBS,OUTPUT);

CONSTR2(INPUT, ACTOBS).. SUM(SUBOBS, WEIGHT(SUBOBS)*ACT(SUBOBS,INPUT)) =L=
LAMBDA*ACT(ACTOBS,INPUT);

*/*Define a parameter to hold results for each pass through the loop*/*

PARAMETER

score1(obs) efficiency scores
;

*/*Define an external file to hold results*/*

file primal /teinp_res.txt/;

*/*The model defined below consists of two equations.
CONSTR1, CONSTR2 */*

MODEL TEDEA /CONSTR1, CONSTR2/;

tedea.solprint=2; */*Turn off writing results to solution file*/*
tedea.solvelink=2; */*Keep model in memory. Improves solution time*/*

LOOP(SUBOBS1,

```
ACTOBS(OBS) = NO;
ACTOBS(SUBOBS1) = YES;
SOLVE TEDEA minimizing Lambda USING LP;
```

```
score1(SUBOBS1) = lambda.1;
```

```
/*the put statement below writes out the solver status and model
status to an external file. If the model for an individual observation
does not solve, examination of the file will allow one to determine
which observation did not solve*/
```

```
put primal;
```

```
if ((tedea.modelstat eq 1 and tedea.solvestat eq 1),
```

```
    put @1, subobs1.tl, @10, "optimal", @25, "normal completion" /
```

```
else
```

```
    put @1, subobs1.tl, @10, tedea.modelstat:>2:0,
        @25, tedea.solvestat:>2:0/
```

```
);
);
```

```
/*The next file is to output results to a .csv file.
Results could also be printed to the listing file with
the use of the display command*/
```

```
file res /te_inp_crs.csv/;
```

```
res.pc=5;
res.pw=100;
```

```
put res;
```

```
put 'obs', 'score' /;
loop (subobs1,
```

```
    put subobs1.tl, score1(subobs1)/
);
```

```
putclose;
```