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$oninline
/*
 GAMS program used to estimate technical efficiency.

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This version will estimate technical efficiency
based on an input oriented DEA model, with
variable returns to scale. Models can
be found in Fare, Grosskopf and Lovell (1994)*/

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

$OFFSYMLIST OFFSYMXREF OFFUELLIST OFFUELXREF

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

/*NEXT DEFINE INPUTS AND OUTPUTS*/


SET INOUT /x1*x6, y1*y3/

     OUTPUT(INOUT) /y1*y3/

    INPUT(INOUT) /x1*x6/

    OBS /1*2000/
    SUBOBS(OBS) /1*201/
    ACTOBS(OBS)

;

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

alias (subobs, subobs1);

$OFFLISTING
TABLE ACT(OBS,INOUT)  INPUT OUTPUT TABLE
$ondelim
$INCLUDE "data2.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 and calculating TE
    CONSTR3                DEA Constraint for imposing VRS;


    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);

    CONSTR3..                 SUM(SUBOBS, WEIGHT(SUBOBS)) =E= 1;

MODEL TE /all/;

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

file primal /teinp_vrs.txt/;

parameter score1(obs) efficiency scores;

LOOP(SUBOBS1,

     ACTOBS(OBS)=NO;
     ACTOBS(SUBOBS1)=YES;
     SOLVE TE minimizing lambda using LP;

     score1(SUBOBS1) = lambda.l;

     put primal;

     if ((te.modelstat eq 1 and te.solvestat eq 1),

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

     else

       put @1, subobs1.tl, @10, te.modelstat:>2:0, @25, te.solvestat:>2.0/
     ); /*end if*/

);  /*end loop*/

/*results are now printed out to the file 'te_inp_vrs.csv'.
There are other ways to place results in an external file. Refer
to the GAMS manual for more infortmation. Since this program is run on
a Linux system, I use the put utility which comes with GAMS*/

file sr /te_inp_vrs.csv/;

sr.pc=5;

put sr;
```

```
put 'obs', 'lambda';
put /;
loop(subobs, put subobs.tl, score1(subobs):4;
  put /;

);

putclose; /*closes external files*/
```