```
$Title Pricing_SCND

Sets
S        /s1*s10/
D        /d1*d20/
C        /c1*c30/
;

Parameters
A(s)
f(d)
b(s)
trSD(s,d)
trDC(d,c)
dem(c)
capD(d)
capS(s)
;

Scalar beta /3/;

Scalar PU  /20/
;


A(s)      = uniform(1000,1500);
f(d)      = uniform(2000,3000);
b(s)      = uniform(5,10);
trSD(s,d)= uniform(1,2);
trDC(d,c)= uniform(0.5,0.7);
dem(c)    = uniform(50,100);
capD(d)   = uniform(500,1000);
capS(s)   = uniform(1000,2000);

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

Free Variable
Z;

Binary Variables
y(s)
x(d)
;

Positive Variable
p
u(s)
QSD(s,d)
QDC(d,c)
;
p.up=20;

Equations
obj
cons1
cons2
cons3
cons4
cons5
cons6
```

```
;

obj..    z =e=  sum(c,p*dem(c) - p*beta*p) - (sum(d,f(d)*x(d)) + sum(s,A(s)*y(s)) + su»
m({s,d},trSD(s,d)*QSD(s,d))
                                                + sum({d,c},trDC(d,c)*QDC(d,c)) + s»
um(s,b(s)*u(s))) ;

cons1(s)..       u(s) =L= capS(s)*y(s);

cons2(d)..       sum(S,QSD(s,d))=L= capD(d)*x(d);

cons3(s)..       u(s) =e= sum(d,QSD(s,d));

cons4(d)..       sum(s,QSD(s,d)) =e= sum(c,QDC(d,c));

cons5(c)..       sum(d,QDC(d,c)) =e= dem(c) - beta*p;

*cons5(d)..       p =l= PU*x(d);
*cons6(s)..       p =l= PU*y(s);


Model Pricing_SCND
/
obj
cons1
cons2
cons3
cons4
cons5
/
;

Options
MIQCP = CPLEX
reslim =100
*maximum run time (sec.)
optcr = 0
;

*for(beta = 1 to 4 by 1,

Solve Pricing_SCND us MIQCP max Z;

Display
"ouout for beta"
beta
p.l
Z.l
y.l
x.l
QSD.l
QDC.l
cons1.m
*use

*)

*Parameters
*use(d);
*use(d)=sum(S,QSD.l(s,d));
```