

\$title subsidy model in MPSGE format

SETS

G Global set of SAM accounts
/
 AGR agriculture
 MAN manufacturing
 LAB labor
 CAP capital
 HH-U urban household
 HH-R rural household./

C(G) Commodities /AGR, MAN./
F(G) Factors /LAB, CAP./
H(G) Households /HH-U, HH-R:/(

ALIAS (G,GG), (C,CC), (F,FF:(

PARAMETERS

beta(C,H) household consumption shares
fd0(F,C) benchmark factor demand
hd0(C,H) benchmark household consumption
fs0(F,H) benchmark factor endowments
q0(C) benchmark output levels
hw0(H) benchmark household expenditure
p0(C) initial commodity price
pf0(F) initial factor price
pw0(H) initial consumer price index
gd0(C) benchmark government purchases
gp0 government total provision
pg0 government expenditure price index
tf(F) factor income taxes
x0 benchmark exports of AGR
m0 benchmark imports of MAN
xch nominal exchange rate
tx export subsidy
tm import tariff:(

*SAM and parameter calibration:

Table SAM(*,*) Rectangular SAM with pre-existing taxes

	AGR	MAN	GOV	HH-U	HH-R	ROW
AGR	113		10-	35-	58-	10-
MAN		162	25-	105-	42-	10
LAB	70-	60-		50	80	
CAP	30-	80-		90	20	
LTX	7-	6-	13			
KTX	6-	16-	22			
EXCH						:

p0(C)=1; pf0("LAB")=1.1; pf0("CAP")=1.2; pw0(H)=1:
q0(C) = sam(C,C)/p0(C):(
fd0(F,C) = -sam(F,C):(
hd0(C,H) = -sam(C,H)/p0(C):(
fs0(F,H) = sam(F,H):(
hw0(H) = sum(C, hd0(C,H))/pw0(H):(
beta(C,H) = hd0(C,H)*p0(C)/sum(CC, hd0(CC,H))*p0(CC):((
gd0(C) = -sam(C,"gov":(""
gp0 = sum(C, gd0(C):((
pg0 =1:
tf("LAB")=0.1:

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tf("CAP")=0.2:
x0 = -sam("AGR","ROW:("
m0 = SAM("MAN","ROW:("
tx = 0:
tm = 0:
xch=1:

*Model Block:

$ONTEXT
$MODEL:SUBSIDY

$SECTORS:
  Q(C)      ! commodity output level
  W(H)      ! welfare or aggregate consumption
  GV        !government activity level
  X         !exports of AGR
  M         !imports of MAN

$COMMODITIES:
  P(C)      ! commodity price
  PW(H)     ! expenditure price index
  PF(F)     ! factor price
  PG        !government expenditure price index
  PFX       !real exchange rate

$CONSUMERS:
  YH(H)     ! household income
  GOV       !government income

$PROD:Q(C) S:1
  O:P(C)   Q:q0(C(
  I:PF(F)  Q:fd0(F,C) P:pf0(F) A:GOV T:tf(F (

$PROD:X
  O:PFX     Q:(x0*XCH(
  I:P("AGR") Q:x0      A:GOV T:tx

$PROD:M
  O:P("MAN") Q:m0
  I:PFX     Q:(m0/XCH) A:GOV T:tm

$PROD:W(H) S:1
  O:PW(H)   Q:hw0(H(
  I:P(C)    Q:hd0(C,H(

$PROD:GV S:1
  O:PG      Q:gp0
  I:P(C)    Q:gd0(C(

$DEMAND:YH(H (
  D:PW(H)   Q:hw0(H(
  E:PF(F)   Q:fs0(F,H(

*For GOV there is no endowment but has tax income
$DEMAND:GOV
  D:PG      Q:gp0

$OFFTEXT

$SYSINCLUDE mpsgeset SUBSIDY

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$INCLUDE SUBSIDY.GEN

*Replicate Benchmark:
SUBSIDY.ITERLIM=0:
SOLVE SUBSIDY USING MCP:

*Policy Simulations and Reports

*Define policy scenario (10% export subsidy:(
tx = -0.1:

*Define report parameters :
PARAMETERS
  w_ch(H)  percentage welfare change
  x_ch      percentage change in exports:

*Set numeraire to deflate prices in the model:
PW.FX("HH-R")=1:

*Relax the interation limit:
SUBSIDY.ITERLIM=1000:

*solve the model:
$INCLUDE SUBSIDY.GEN
  solve SUBSIDY using mcp:

*compute report parameters:
  w_ch(H) = 100*(1-W.L(H:(
  x_ch = 100*(X.L-1:(

*Display results:

DISPLAY w_ch,x_ch:

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