

```

2
3 SETS
4 G Global set of SAM accounts
/
5 AGR agriculture
6 MAN manufacturing
7 LAB labor
8 CAP capital
9 HH-U urban household
10 HH-R rural household./
11
12 C(G) Commodities /AGR, MAN./
13 F(G) Factors /LAB, CAP./
14 H(G) Households /HH-U, HH-R:/
15
16 ALIAS (G,GG), (C,CC), (F,FF):(
17
18
19 PARAMETERS
20 beta(C,H) household consumption shares
21 fd0(F,C) benchmark factor demand
22 hd0(C,H) benchmark household consumption
23 fs0(F,H) benchmark factor endowments
24 q0(C) benchmark output levels
25 hw0(H) benchmark household expenditure
26 p0(C) initial commodity price
27 pf0(F) initial factor price
28 pw0(H) initial consumer price index
29 gd0(C) benchmark government purchases
30 gp0 government total provision
31 pg0 government expenditure price index
32 tf(F) factor income taxes
33 x0 benchmark exports of AGR
34 m0 benchmark imports of MAN
35 xch nominal exchange rate
36 tx export subsidy
37 tm import tariff:
38
39
* 40 SAM and parameter calibration:
41 Table SAM(*,*) Rectangular SAM with pre-existing taxes
42 AGR MAN GOV HH-U HH-R ROW
43 AGR 113 -10 -35 -58 -10
44 MAN 162 -25 -105 -42 10
45 LAB -70 -60 50 80
46 CAP -30 -80 90 20
47 LTX -713 6-
48 KTX -6 -16 22
49 EXCH:
50
51 p0(C)=1; pf0("LAB")=1.1; pf0("CAP")=1.2; pw0(H)=1:
52 q0(C) = sam(C,C)/p0(C):(
53 fd0(F,C) = -sam(F,C):(
54 hd0(C,H) = -sam(C,H)/p0(C):(
55 fs0(F,H) = sam(F,H):(
    
```

```
56 hw0(H) = sum(C, hd0(C,H))/pw0(H:(
57 beta(C,H) = hd0(C,H)*p0(C)/sum(CC, hd0(CC,H)*p0(CC:( (
58 gd0(C) = -sam(C,"gov:( "
59 gp0 = sum(C, gd0(C:( (
60 pg0 =1:
61 tf("LAB")=0.1:
62 tf("CAP")=0.2:
63 x0 = -sam("AGR","ROW:( "
64 m0 = SAM("MAN","ROW:( "
65 tx = 0:
66 tm = 0:
67 xch=1:
68
* 69 Model Block:
70
$ 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
```

121

```
SYSINCLUDE C:\PROGRAM FILES\GAMS20.0\MPSGESET
INCLUDE C:\CGE\225A\GAMSGEH.SCR
```

MPSGE PREPROCESSOR VERSION 12/95 VIS Windows

```
1
$ 2 SECTORS:
3 Q(C) ! commodity output level
4 W(H) ! welfare or aggregate consumption
5 GV !government activity level
6 X !exports of AGR
7 M !imports of MAN

8
$ 9 COMMODITIES:
10 P(C) ! commodity price
11 PW(H) ! expenditure price index
12 PF(F) ! factor price
13 PG !government expenditure price index
14 PFX !real exchange rate

15
$ 16 CONSUMERS:
17 YH(H) ! household income
18 GOV !government income

19
$ 20 PROD:Q(C) S:1
21 O:P(C) Q:q0(C(
22 I:PF(F) Q:fd0(F,C) P:pf0(F) A:GOV T:tf(F(

23
$ 24 PROD:X
25 O:PFX Q:(x0*XCH(
26 I:P("AGR") Q:x0 A:GOV T:tx

27
$ 28 PROD:M
29 O:P("MAN") Q:m0
30 I:PFX Q:(m0*XCH) A:GOV T:tm

31
$ 32 PROD:W(H) S:1
33 O:PW(H) Q:hw0(H(
34 I:P(C) Q:hd0(C,H(

35
$ 36 PROD:GV S:1
37 O:PG Q:gp0
38 I:P(C) Q:gd0(C(

39
$ 40 DEMAND:YH(H(
```

```

41          D:PW(H) Q:hw0(H(
42          E:PF(F) Q:fs0(F,H(
43
* 44          For GOV there is no endowment but has tax income
$ 45          DEMAND:GOV
46          D:PG      Q:gp0
47
$ 48          OFFTEXT
  
```

Symbol Listing

Note: Parameter and set references appearing within parentheses are not identified by the preprocessor.

Symbol	Type	References								
" AGR"	SET	26								
" MAN"	SET	29								
C	SET	3	20	21	21	22	34	34	38	38
F	SET	12	22	22	22	22	42	42		
FD0	PARAM	22								
FS0	PARAM	42								
GD0	PARAM	38								
GOV	CONSU	18	2245	30	26					
GP0	PARAM	37	46							
GV	ACTIV	5	36							
H	SET	4	32	33	33	34	40	41	41	42
HDO	PARAM	34								
HW0	PARAM	33	41							
M	ACTIV	7	28							
M0	PARAM	29								
P	PRICE	10	21	26	29	34	38			
PF	PRICE	12	22	42						
PF0	PARAM	22								
PFX	PRICE30	25	14							
PG	PRICE	13	37	46						
PW	PRICE	11	33	41						
Q	ACTIV	3	20							
Q0	PARAM	21								
TF	PARAM	22								
TM	PARAM	30								
TX	PARAM	26								
W	ACTIV	4	32							
X	ACTIV	6	24							
X0	PARAM	26								
YH	CONSU	17	40							

```

298
301 SUBSIDY.INTEGER1=1:
302 option oldname:
EXIT C:\PROGRAM FILES\GAMS20.0\MPSGESET
INCLUDE C:\CGE\SUBSIDY.GEN
451
  
```

```
* 452 Replicate Benchmark:
453 SUBSIDY.ITERLIM=0;
454 SOLVE SUBSIDY USING MCP;
455
* 456 Policy Simulations and Reports
457
* 458 Define policy scenario (10% export subsidy:(
459 tx = -0.1;
460
* 461 Define report parameters:
462 PARAMETERS
463   w_ch(H)           percentage welfare change
464   x_ch              percentage change in exports;
465
* 466 Set numeraire to deflate prices in the model:
467 PW.FX("HH-R")=1;
468
* 469 Relax the interation limit:
470 SUBSIDY.ITERLIM=1000;
471
* 472 solve the model:
INCLUDE      C:\CGE\SUBSIDY.GEN
620 solve SUBSIDY using mcp;
621
* 622 compute report parameters:
623   w_ch(H) = 100*(1-W.L(H:((
624   x_ch = 100*(X.L-1:(
625
* 626 Display results:
627
628 DISPLAY w_ch,x_ch;
```

subsidy model in MPSGE format
02/28/03 09:25:40 PAGE 6
Include File Summary
GAMS Rev 121 Windows NT/95/98

SEQ	GLOBAL	TYPE	PARENT	LOCAL	FILENAME
1	1	INPUT	0	0	C:\CGE\SUBSIDY.GMS
122	2	SYSINCLUDE	1	122	.C:\PROGRAM FILES\GAMS20.0\MPSGESET
141	3	CALL	2	19	.gmsge_nx "C:\CGE\225A\gamsge.scr"
142	4	INCLUDE	2	20	..C:\CGE\225A\GAMSGEH.SCR
303	5	EXIT	2	22	.C:\PROGRAM FILES\GAMS20.0\MPSGESET
304	6	INCLUDE	1	123	.C:\CGE\SUBSIDY.GEN
450	7	EXIT	6	146	.C:\CGE\SUBSIDY.GEN
473	8	INCLUDE	1	146	.C:\CGE\SUBSIDY.GEN
619	9	EXIT	8	146	.C:\CGE\SUBSIDY.GEN

COMPILATION TIME = 0.110 SECONDS 0.7 Mb WIN200-121

subsidy model in MPSGE format
02/28/03 09:25:40 PAGE 7
Model Statistics SOLVE SUBSIDY USING MCP FROM LINE 454
GAMS Rev 121 Windows NT/95/98

MODEL STATISTICS

BLOCKS OF EQUATIONS	1	SINGLE EQUATIONS	1
BLOCKS OF VARIABLES	12	SINGLE VARIABLES	18
NON ZERO ELEMENTS	18	NON LINEAR N-Z	0
DERIVATIVE POOL	3	CONSTANT POOL	0
CODE LENGTH	1		

GENERATION TIME = 0.031 SECONDS 1.9 Mb WIN200-121

EXECUTION TIME = 0.041 SECONDS 1.9 Mb WIN200-121

S O L V E S U M M A R Y

MODEL SUBSIDY
 TYPE MCP
 SOLVER PATH FROM LINE 454

****SOLVER STATUS 1 NORMAL COMPLETION
 ****MODEL STATUS 1 OPTIMAL

RESOURCE USAGE, LIMIT 0.242 1000.000
 ITERATION COUNT, LIMIT 00
 EVALUATION ERRORS 0 0

Work space allocated -- 6.87 Mb

Default price normalization using income for YH.HH-U
 Path v4.4a: GAMS Link ver043, Wintel
 17row/cols, 100 non-zeros, 34.60% dense.

Path 4.4a (Mon Mar 19 17:44:21 2001(
 Written by Todd Munson, Steven Dirkse, and Michael Ferris

INITIAL POINT STATISTICS

Maximum of X. 1.0000e+002 var: (YH.HH-R(
 Maximum of F. 0.0000e+000 eqn: (Q.AGR(
 Maximum of Grad F1.6200 e+002 eqn: (P.MAN(
 var: (Q.MAN(

INITIAL JACOBIAN NORM STATISTICS

Maximum Row Norm. 4.5951e+002 eqn: (P.MAN(
 Minimum Row Norm. 2.0000e+001 eqn: (X(
 Maximum Column Norm 4.5951e+002 var: (P.MAN(
 Minimum Column Norm 2.0000e+000 var: (YH.HH-R(

FINAL STATISTICS

Inf-Norm of Complementarity . . 0.0000e+000 eqn: (Q.AGR(
 Inf-Norm of Normal Map. 0.0000e+000 eqn: (Q.AGR(
 Inf-Norm of Minimum Map 0.0000e+000 eqn: (Q.AGR(
 Inf-Norm of Fischer Function. . . 0.0000e+000 eqn: (Q.AGR(
 Inf-Norm of Grad Fischer Fcn. . . 0.0000e+000 eqn: (Q.AGR(

FINAL POINT STATISTICS

Maximum of X. 1.0000e+002 var: (YH.HH-R(
 Maximum of F. 0.0000e+000 eqn: (Q.AGR(
 Maximum of Grad F 1.6200e+002 eqn: (P.MAN(
 var: (Q.MAN(

LOWER LEVEL UPPER MARGINAL

----EQU DUMMY01 . 290.0000 . .

DUMMY01 Artificial equation for model: SUBSIDY

----VAR Q commodity output level

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.0000	+INF	.
MAN	.	1.0000	+INF	.

----VAR W welfare or aggregate consumption

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	1.0000	+INF	.
HH-R	.	1.0000	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
----VAR GV	.	1.0000	+INF	.
----VAR X	.	1.0000	+INF	.
----VAR M	.	1.0000	+INF	.

GV government activity level
 X exports of AGR
 M imports of MAN

----VAR P commodity price

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.0000	+INF	.
MAN	.	1.0000	+INF	.

----VAR PW expenditure price index

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	1.0000	+INF	.
HH-R	.	1.0000	+INF	.

----VAR PF factor price

	LOWER	LEVEL	UPPER	MARGINAL
LAB	.	1.0000	+INF	.
CAP+	1.0000	.	INF	.

GAMS Rev 121 Windows NT/95/98

	LOWER	LEVEL	UPPER	MARGINAL
----VAR PG	.	1.0000	+INF	.
----VAR PFX	.	1.0000	+INF	.

PG government expenditure price index
 PFX real exchange rate

----VAR YH household income

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	140.0000	+INF	.
HH-R	.	100.0000	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
----VAR GOV+	35.0000	.	INF	.

GOV government income

```

****REPORT SUMMARY :      0      NONOPT
0      INFEASIBLE
0      UNBOUNDED
0      REDEFINED
0      ERRORS
  
```

subsidy model in MPSGE format
02/28/03 09:25:40 PAGE 11
Model Statistics SOLVE SUBSIDY USING MCP FROM LINE 620
GAMS Rev 121 Windows NT/95/98

MODEL STATISTICS

BLOCKS OF EQUATIONS	1	SINGLE EQUATIONS	1
BLOCKS OF VARIABLES	12	SINGLE VARIABLES	18
NON ZERO ELEMENTS	18	NON LINEAR N-Z	0
DERIVATIVE POOL	3	CONSTANT POOL	0
CODE LENGTH	1		

GENERATION TIME = 0.040 SECONDS 1.9 Mb WIN200-121

EXECUTION TIME = 0.060 SECONDS 1.9 Mb WIN200-121

S O L V E S U M M A R Y

MODEL SUBSIDY
 TYPE MCP
 SOLVER PATH FROM LINE 620

***SOLVER STATUS 1 NORMAL COMPLETION
 ***MODEL STATUS 1 OPTIMAL

RESOURCE USAGE, LIMIT 0.250 1000.000
 ITERATION COUNT, LIMIT 3 1000
 EVALUATION ERRORS 0 0

Work space allocated -- 6.87 Mb

Path v4.4a: GAMS Link ver043, Wintel
 17row/cols, 102 non-zeros, 35.29% dense.

Path 4.4a (Mon Mar 19 17:44:21 2001)
 Written by Todd Munson, Steven Dirkse, and Michael Ferris

INITIAL POINT STATISTICS

Maximum of X. 1.4000e+002 var: (YH.HH-U(
 Maximum of F. 1.0000e+000 eqn: (X(
 Maximum of Grad F 1.6200e+002 eqn: (P.MAN(
 var: (Q.MAN(

INITIAL JACOBIAN NORM STATISTICS

Maximum Row Norm. 4.5951e+002 eqn: (P.MAN(
 Minimum Row Norm. 1.9000e+001 eqn: (X(
 Maximum Column Norm 4.5951e+002 var: (P.MAN(
 Minimum Column Norm 1.0000e+000 var: (YH.HH-R(

FINAL STATISTICS

Inf-Norm of Complementarity . . 5.6401e-008 eqn: (PG(
 Inf-Norm of Normal Map. 5.8177e-008 eqn: (PG(
 Inf-Norm of Minimum Map 5.8177e-008 eqn: (PG(
 Inf-Norm of Fischer Function. . . 5.8177e-008 eqn: (PG(
 Inf-Norm of Grad Fischer Fcn. . . 3.1689e-006 eqn: (PF.CAP(

FINAL POINT STATISTICS

Maximum of X. 1.3146e+002 var: (YH.HH-U(
 Maximum of F. 5.8177e-008 eqn: (PG(
 Maximum of Grad F 1.6200e+002 eqn: (P.MAN(
 var: (Q.MAN(

LOWER LEVEL UPPER MARGINAL

----EQU DUMMY01 . 297.4158 . .

DUMMY01 Artificial equation for model: SUBSIDY

----VAR Q commodity output level

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.7570	+INF	.
MAN	.	0.4435	+INF	.

----VAR W welfare or aggregate consumption

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	0.9722	+INF	.
HH-R	.	1.1060	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
----VAR GV	.		0.6675	+INF .
----VAR X	.		9.9535	+INF .
----VAR M	.		9.9535	+INF .

GV government activity level
 X exports of AGR
 M imports of MAN

----VAR P commodity price

	LOWER	LEVEL	UPPER	MARGINAL
AGR+	1.0452	.	INF	.
MAN	.	0.9407	+INF	.

----VAR PW expenditure price index

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	0.9658	+INF	.
HH-R	1.0000	1.0000	1.0000	EPS

----VAR PF factor price

	LOWER	LEVEL	UPPER	MARGINAL
LAB+	1.1815	.	INF	.
CAP	.	0.8043	+INF	.

GAMS Rev 121 Windows NT/95/98

	LOWER	LEVEL	UPPER	MARGINAL
----VAR PG+	0.9695	.	INF	.
----VAR PFX	.	0.9407	+INF	.

PG government expenditure price index
 PFX real exchange rate

----VAR YH household income

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	131.4615	+INF	.
HH-R	.	110.6032	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
----VAR GOV	.	22.6501	+INF	.

GOV government income

```

****REPORT SUMMARY :      0      NONOPT
0      INFEASIBLE
0      UNBOUNDED
0      REDEFINED
0      ERRORS
  
```

subsidy model in MPSGE format
02/28/03 09:25:40 PAGE 15
E x e c u t i o n
GAMS Rev 121 Windows NT/95/98

628 ----PARAMETER w_ch percentage welfare change
HH-U 2.777, HH-R -10.603

628 ----PARAMETER x_ch = 895.347 percentage change in
exports

***REPORT FILE SUMMARY

MPS C:\CGE\225A\GAMSCGE.SCR

EXECUTION TIME = 0.020 SECONDS 1.4 Mb WIN200-121

USER: CEEPR-JP G010822:1111AP-WIN
MIT DC11

***FILE SUMMARY

INPUT C:\CGE\SUBSIDY.GMS
OUTPUT C:\CGE\SUBSIDY.LST