

GAMS Rev 121 Windows NT/95/98

```

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):(
    
```

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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:DEVAL

$        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(
```

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```

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 |
| HD0 | 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 DEVAL.INTEGER1=1:
302 option oldname:
EXIT C:\PROGRAM FILES\GAMS20.0\MPSGESET
INCLUDE C:\CGE\DEVAL.GEN
451
    
```

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```
* 452 Replicate Benchmark:
453 DEVAL.ITERLIM=0:
454 SOLVE DEVAL USING MCP:
455
* 456 Policy Simulations and Reports
457
* 458 Define policy scenario (25% Devaluation of national currency:(
459 XCH = 0.9:
460
* 461 Define report parameters:
462 PARAMETERS
463   w_ch(H)            percentage welfare change
464   x_ch                percentage change in exports
465   m_ch                percentage change in imports:
466
* 467 Set numeraire to deflate prices in the model:
468 PW.FX("HH-R")=1:
469
* 470 Relax the interation limit:
471 DEVAL.ITERLIM=1000:
472
* 473 solve the model:
INCLUDE        C:\CGE\DEVAL.GEN
474        621 solve DEVAL using mcp:
475        622
* 476        623 compute report parameters:
477        624 w_ch(H) = 100*(W.L(H)-1):(
478        625 x_ch = 100*(X.L-1):(
479        626 m_ch = 100*(M.L-1):(
480        627
* 481        628 Display results:
482        629
483        630 DISPLAY w_ch,x_ch,m_ch:
```

DEVALUATION model in MPSGE format
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 Include File Summary
 GAMS Rev 121 Windows NT/95/98

| SEQ | GLOBAL | TYPE | PARENT | LOCAL | FILENAME |
|-----|--------|------------|--------|-------|-------------------------------------|
| 1 | 1 | INPUT | 0 | 0 | C:\CGE\DEVAL.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\DEVAL.GEN |
| 450 | 7 | EXIT | 6 | 146 | .C:\CGE\DEVAL.GEN |
| 474 | 8 | INCLUDE | 1 | 147 | .C:\CGE\DEVAL.GEN |
| 620 | 9 | EXIT | 8 | 146 | .C:\CGE\DEVAL.GEN |

COMPILATION TIME = 0.091 SECONDS 0.7 Mb WIN200-121

DEVALUATION model in MPSGE format
03/01/03 00:39:25 PAGE 7
Model Statistics SOLVE DEVAL 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 = 0.030 SECONDS 1.9 Mb WIN200-121

EXECUTION TIME = 0.040 SECONDS 1.9 Mb WIN200-121

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

MODEL DEVAL
TYPE MCP
SOLVER PATH FROM LINE 454

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

RESOURCE USAGE, LIMIT 0.250 1000.000
ITERATION COUNT, LIMIT 0 0
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 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. 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: DEVAL

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----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 | . |

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| | 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

DEVALUATION model in MPSGE format
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Model Statistics SOLVE DEVAL USING MCP FROM LINE 621
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 = 0.030 SECONDS 1.9 Mb WIN200-121

EXECUTION TIME = 0.050 SECONDS 1.9 Mb WIN200-121

GAMS Rev 121 Windows NT/95/98

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

MODEL DEVAL
 TYPE MCP
 SOLVER PATH FROM LINE621

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

RESOURCE USAGE, LIMIT 0.250 1000.000
 ITERATION COUNT, LIMIT 4 1000
 EVALUATION ERRORS 0 0

Work space allocated -- 6.87 Mb

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. 1.4000e+002 var: (YH.HH-U(
 Maximum of F. 2.1111e+000 eqn: (PFX(
 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 . . 8.5585e-014 eqn: (PW.HH-U(
 Inf-Norm of Normal Map. 8.5265e-014 eqn: (PW.HH-U(
 Inf-Norm of Minimum Map 8.5265e-014 eqn: (PW.HH-U(
 Inf-Norm of Fischer Function. . 8.5265e-014 eqn: (PW.HH-U(
 Inf-Norm of Grad Fischer Fcn. . 1.3178e-011 eqn: (W.HH-U(

FINAL POINT STATISTICS

Maximum of X. 1.4125e+002 var: (YH.HH-U(
 Maximum of F. 1.7990e+000 eqn: (X(
 Maximum of Grad F 1.6200e 002+eqn: (P.MAN(
 var: (Q.MAN(

LOWER LEVEL UPPER MARGINAL

----EQU DUMMY01 . 288.4820 . .

DUMMY01 Artificial equation for model: DEVAL

GAMS Rev 121 Windows NT/95/98

----VAR Q commodity output level

| | LOWER | LEVEL | UPPER | MARGINAL |
|-----|-------|--------|-------|----------|
| AGR | . | 0.9145 | +INF | . |
| MAN | . | 1.0593 | +INF | . |

----VAR W welfare or aggregate consumption

| | LOWER | LEVEL | UPPER | MARGINAL |
|-------|--------|--------|-------|----------|
| HH-U | . | 1.0051 | +INF | . |
| HH-R+ | 0.9905 | . | INF | . |

| | LOWER | LEVEL | UPPER | MARGINAL |
|--|-------|-------|-------|----------|
|--|-------|-------|-------|----------|

| | | | | | |
|------------|---|--|--------|------|---|
| ----VAR GV | . | | 1.0049 | +INF | . |
|------------|---|--|--------|------|---|

| | | | | | |
|-----------|---|--|---|------|--------|
| ----VAR X | . | | . | +INF | 1.7990 |
|-----------|---|--|---|------|--------|

| | | | | | |
|-----------|---|--|---|------|-----|
| ----VAR M | . | | . | +INF | EPS |
|-----------|---|--|---|------|-----|

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

----VAR P commodity price

| | LOWER | LEVEL | UPPER | MARGINAL |
|-----|-------|--------|-------|----------|
| AGR | . | 0.9952 | +INF | . |
| MAN | . | 1.0066 | +INF | . |

----VAR PW expenditure price index

| | LOWER | LEVEL | UPPER | MARGINAL |
|------|--------|--------|--------|----------|
| HH-U | . | 1.0037 | +INF | . |
| HH-R | 1.0000 | 1.0000 | 1.0000 | EPS |

----VAR PF factor price

| | LOWER | LEVEL | UPPER | MARGINAL |
|-----|-------|--------|-------|----------|
| LAB | . | 0.9822 | +INF | . |
| CAP | . | 1.0237 | +INF | . |

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| | LOWER | LEVEL | UPPER | MARGINAL |
|-------------|-------|--------|-------|----------|
| ----VAR PG | . | 1.0033 | +INF | . |
| ----VAR PFX | . | 0.9059 | +INF | . |

PG government expenditure price index
 PFX real exchange rate

----VAR YH household income

| | LOWER | LEVEL | UPPER | MARGINAL |
|-------|---------|----------|-------|----------|
| HH-U | . | 141.2450 | +INF | . |
| HH-R+ | 99.0512 | . | INF | . |

| | LOWER | LEVEL | UPPER | MARGINAL |
|-------------|-------|---------|-------|----------|
| ----VAR GOV | . | 35.2905 | +INF | . |

GOV government income

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

DEVALUATION model in MPSGE format

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E x e c u t i o n
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630 ----PARAMETER w_ch percentage welfare change

HH-U 0.512, HH-R -0.949

630 ----PARAMETER x_ch = -100.000 percentage change in
exports

PARAMETER m_ch = -100.000 percentage change in
imports

***REPORT FILE SUMMARY

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

EXECUTION TIME = 0.010 SECONDS 1.4 Mb WIN200-121

USER: CEEPR-JP
MIT

G010822:1111AP-WIN
DC11

***FILE SUMMARY

INPUT C:\CGE\DEVAL.GMS

OUTPUT C:\CGE\DEVAL.LST