

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
30
* 31 SAM and parameter calibration:
32 Table SAM(*,*) Rectangular SAM
33 AGR MAN HH-U HH-R
34 AGR 100 -40 -60
35 MAN 140 -100 -40
36 LAB -70 -60 50 80
37 CAP -30 -80 90 20
38
39 p0(C)=1; pf0(F)=1; pw0(H)=1;
40 q0(C) = sam(C,C)/p0(C);
41 fd0(F,C) = -sam(F,C)/pf0(F);
42 hd0(C,H) = -sam(C,H)/p0(C);
43 fs0(F,H) = sam(F,H)/pf0(F);
44 hw0(H) = sum(C, hd0(C,H))/pw0(H);
45 beta(C,H) = hd0(C,H)*p0(C)/sum(CC, hd0(CC,H))*p0(CC);
```

46

* 47 Model Block:

48

\$ MODEL:CGE

\$ SECTORS:

Q(C) ! commodity output

W(H) ! welfare or aggregate consumption

\$ COMMODITIES:

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```

    P(C)    ! commodity price
    PW(H)   ! expenditure price index
    PF(F)   ! factor price

$ CONSUMERS:
    YH(H)  ! household income

$ PROD:Q(C) S:1
    O:P(C) Q:q0(C(
    I:PF(F) Q:fd0(F,C(

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

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

77

```
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
4   W(H)    ! welfare or aggregate consumption
5
$ 6 COMMODITIES:
7   P(C)    ! commodity price
8   PW(H)   ! expenditure price index
9   PF(F)   ! factor price
10
$ 11 CONSUMERS:
12  YH(H)   ! household income
13
$ 14 PROD:Q(C) S:1
15  O:P(C)  Q:q0(C(
16  I:PF(F) Q:fd0(F,C(
17
$ 18 PROD:W(H) S:1
19  O:PW(H) Q:hw0(H(
20  I:P(C)  Q:hd0(C,H(
```

21
\$ 22 DEMAND:YH(H(
23 D:PW(H) Q:hw0(H(
24 E:PF(F) Q:fs0(F,H(
25
\$ 26 OFFTEXT

Symbol Listing

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

Symbol	Type	References
C	SET	3 14 15 15 16 20 20
F	SET	9 16 16 24 24
FD0	PARAM	16
FS0	PARAM	24
H	SET	4 18 19 19 20 22 23 23 24
HD0	PARAM	20
HW0	PARAM	19 23
P	PRICE	7 15 20
PF	PRICE	9 16 24
PW	PRICE	8 19 23
Q	ACTIV	3 14
Q0	PARAM	15
W	ACTIV	4 18
YH	CONSU	12 22

```

199
202 CGE.INTEGER1=1;
203 option oldname;
EXIT C:\PROGRAM FILES\GAMS20.0\MPSGESET
INCLUDE C:\CGE\CGE.GEN
296
* 297 Replicate Benchmark:
298 CGE.ITERLIM=0;
299 SOLVE CGE USING MCP;
300
* 301 Policy Simulations and Reports
302
* 303 Define policy scenarios:
304
305 SET SC simulation scenarios
/ 306 BASE replication of original SAM
307 STOCK 25 percent growth in capital supply
308 LABOR 25 percent growth in labor supply;/
309
* 310 Define report parameters
311 PARAMETERS
312 scfact(F,H,sc) scenario factor supply
313 repp(C,sc) simulation commodity price
    
```

314 repq(C,sc) simulation commodity output
315 repf(F,sc) simulation factor price
316 rephc(C,H,sc) simulation household consumption
317
318
* 319 Define simulation factor supply:
320 scfact(F,H,sc) = fs0(F,H,(
321 scfact("CAP",H,"STOCK")=1.25*fs0("CAP",H,(
322 scfact("LAB",H,"LABOR")=1.25*fs0("LAB",H,(
323
* 324 Set numeraire to deflate prices in the model:

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```
* 325 PW.FX("HH-U")=1;
326
* 327 Relax the iteration limit:
328 CGE.ITERLIM=1000;
329
* 330 Loop over scenarios and solve the model:
331 LOOP(sc;
332 fs0(F,H) = scfact(F,H,sc;
INCLUDE C:\CGE\CGE.GEN
424 solve CGE using mcp;
425
* 426 compute report parameters:
427 repp(C,sc) = P.L(C;(
428 repq(C,sc) = Q.L(C)*q0(C;(
429 repf(F,sc) = PF.L(F;(
430 rephc(C,H,sc) = beta(C,H)*hw0(H)*W.L(H)*PW.L(H)/P.L(C;(
;( 431
432
* 433 Display results:
434 option rephe:1:1:1
435
436 DISPLAY repp, repq, repf, rephe;
```

CGE model in MPSGE format
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Include File Summary
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SEQ	GLOBAL	TYPE	PARENT	LOCAL	FILENAME
1	1	INPUT	0	0	C:\CGE\MPSGE.GMS
78	2	SYSINCLUDE	1	78	.C:\PROGRAM
FILES\GAMS20.0\MPSGESET					
97	3	CALL	2	19	.gmsge_nx "C:\CGE\225A\gamsge.scr"
98	4	INCLUDE	2	20	..C:\CGE\225A\GAMSGEH.SCR
204	5	EXIT	2	22	.C:\PROGRAM FILES\GAMS20.0\MPSGESET
205	6	INCLUDE	1	79	.C:\CGE\CGE.GEN
295	7	EXIT	6	90	.C:\CGE\CGE.GEN
333	8	INCLUDE	1	117	.C:\CGE\CGE.GEN
423	9	EXIT	8	90	.C:\CGE\CGE.GEN

COMPILATION TIME = 0.080 SECONDS 0.7 Mb WIN200-121

CGE model in MPSGE format
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Model Statistics SOLVE CGE USING MCP FROM LINE 299
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MODEL STATISTICS

BLOCKS OF EQUATIONS	1	SINGLE EQUATIONS	1
BLOCKS OF VARIABLES	6	SINGLE VARIABLES	12
NON ZERO ELEMENTS	12	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

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SOLVE SUMMARY

MODEL CGE
TYPE MCP
SOLVER PATH FROM LINE 299

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

RESOURCE USAGE, LIMIT	0.240	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
11row/cols, 66 non-zeros, 54.55% 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 1.4000e+002 eqn: (P.MAN(
var: (Q.MAN(

INITIAL JACOBIAN NORM STATISTICS

Maximum Row Norm. 3.8514e+002 eqn: (P.MAN(
Minimum Row Norm. 1.0100e+002 eqn: (YH.HH-R(
Maximum Column Norm 3.8514e+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 1.4000e+002 eqn: (P.MAN(
var: (Q.MAN(

	LOWER	LEVEL	UPPER	MARGINAL
----EQU DUMMY01	.	250.0000	.	.

DUMMY01 Artificial equation for model: CGE

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----VAR Q commodity output

	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	.

----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	.

----VAR YH household income

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

HH-U	.	140.0000	+INF	.
HH-R	.	100.0000	+INF	.

****REPORT SUMMARY : 0 NONOPT

0	INFEASIBLE
0	UNBOUNDED
0	REDEFINED
0	ERRORS

CGE model in MPSGE format
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Model Statistics SOLVE CGE USING MCP FROM LINE 424
GAMS Rev 121 Windows NT/95/98

LOOPS SC BASE

MODEL STATISTICS

BLOCKS OF EQUATIONS	1	SINGLE EQUATIONS	1
BLOCKS OF VARIABLES	6	SINGLE VARIABLES	12
NON ZERO ELEMENTS	12	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

Maximum of X. 1.0000e+002 var: (YH.HH-R(
Maximum of F. 0.0000e+000 eqn: (Q.AGR(
Maximum of Grad F 1.4000e+002 eqn: (P.MAN(
var: (Q.MAN(

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	LOWER	LEVEL	UPPER	MARGINAL
----EQU DUMMY01	.	250.0000	.	.

DUMMY01 Artificial equation for model: CGE

----VAR Q commodity output

	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	.

----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 .

----VAR YH household income

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

CGE model in MPSGE format
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```
****REPORT SUMMARY :    0  NONOPT
0          INFEASIBLE
0          UNBOUNDED
0          REDEFINED
0          ERRORS
```

CGE model in MPSGE format
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Model Statistics SOLVE CGE USING MCP FROM LINE 424
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LOOPS SC STOCK

MODEL STATISTICS

BLOCKS OF EQUATIONS	1	SINGLE EQUATIONS	1
BLOCKS OF VARIABLES	6	SINGLE VARIABLES	12
NON ZERO ELEMENTS	12	NON LINEAR N-Z	0
DERIVATIVE POOL	3	CONSTANT POOL	0
CODE LENGTH	1		

GENERATION TIME = 0.020 SECONDS 1.9 Mb WIN200-121

EXECUTION TIME = 0.040 SECONDS 1.9 Mb WIN200-121

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LOOPS SC STOCK
SOLVE SUMMARY

MODEL CGE
TYPE MCP
SOLVER PATH FROM LINE 424

****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

Default price normalization using income for YH.HH-U
Path v4.4a: GAMS Link ver043, Wintel
11row/cols, 66 non-zeros, 54.55% 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. 1.0500e+002 var: (YH.HH-R(
Maximum of F. 2.7500e+001 eqn: (PF.CAP(
Maximum of Grad F 1.6250e+002 eqn: (PW.HH-U(
var: (PW.HH-U(

INITIAL JACOBIAN NORM STATISTICS

Maximum Row Norm. 3.8514e+002 eqn: (P.MAN(
Minimum Row Norm. 1.0600e+002 eqn: (YH.HH-R(
Maximum Column Norm 3.8514e+002 var: (P.MAN(
Minimum Column Norm 2.0000e+000 var: (YH.HH-R(

FINAL STATISTICS

Inf-Norm of Complementarity . . 1.8190e-012 eqn: (PF.CAP(
Inf-Norm of Normal Map. 1.8190e-012 eqn: (PF.CAP(
Inf-Norm of Minimum Map 1.8190e-012 eqn: (PF.CAP(
Inf-Norm of Fischer Function. . 1.8190e-012 eqn: (PF.CAP(
Inf-Norm of Grad Fischer Fcn. . 2.3041e-010 eqn: (PF.CAP(
var: (PF.CAP(

FINAL POINT STATISTICS

Maximum of X. 1.1607e+002 var: (YH.HH-R(
Maximum of F. 1.8190e-012 eqn: (PF.CAP(
Maximum of Grad F 1.5036e+002 eqn: (PW.HH-U(
var: (PW.HH-U(

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	LOWER	LEVEL	UPPER	MARGINAL
----EQU DUMMY01	.	289.2844	.	.

DUMMY01 Artificial equation for model: CGE

----VAR Q commodity output

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.0692	+INF	.
MAN	.	1.1360	+INF	.

----VAR W welfare or aggregate consumption

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	1.1165	+INF	.
HH-R	.	1.0955	+INF	.

----VAR P commodity price

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.0856	+INF	.
MAN	.	1.0218	+INF	.

----VAR PW expenditure price index

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	1.0396	+INF	.
HH-R	.	1.0596	+INF	.

----VAR PF factor price

	LOWER	LEVEL	UPPER	MARGINAL
LAB	.	1.1607	+INF	.

CAP . 0.9286 +INF .

----VAR YH household income

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	162.5000	+INF	.
HH-R	.	116.0714	+INF	.

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


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LOOPS SC LABOR
SOLVE SUMMARY

MODEL CGE
TYPE MCP
SOLVER PATH FROM LINE 424

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

RESOURCE USAGE, LIMIT	0.260	1000.000
ITERATION COUNT, LIMIT	4	1000
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
11row/cols, 66 non-zeros, 54.55% 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. 1.3464e+002 var: (YH.HH-R(
Maximum of F. 3.2500e+001 eqn: (PF.LAB(
Maximum of Grad F 1.4445e+002 eqn: (PW.HH-U(
var: (PW.HH-U(

INITIAL JACOBIAN NORM STATISTICS

Maximum Row Norm. 3.9669e+002 eqn: (P.MAN(
Minimum Row Norm. 1.2100e+002 eqn: (YH.HH-R(
Maximum Column Norm 3.9669e+002 var: (P.MAN(
Minimum Column Norm 1.9438e+000 var: (YH.HH-R(

FINAL STATISTICS

Inf-Norm of Complementarity . . 3.0051e-007 eqn: (PW.HH-U(
Inf-Norm of Normal Map. 3.0051e-007 eqn: (PW.HH-U(
Inf-Norm of Minimum Map 3.0051e-007 eqn: (PW.HH-U(
Inf-Norm of Fischer Function. . . 3.0051e-007 eqn: (PW.HH-U(
Inf-Norm of Grad Fischer Fcn. . . 4.6844e-005 eqn: (PW.HH-U(
var: (PW.HH-U(

FINAL POINT STATISTICS

Maximum of X. 1.1151e+002 var: (YH.HH-R(
Maximum of F. 3.0051e-007 eqn: (PW.HH-U(
Maximum of Grad F 1.5736e+002 eqn: (PW.HH-U(
var: (PW.HH-U(

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	LOWER	LEVEL	UPPER	MARGINAL
----EQU DUMMY01	.	278.1054	.	.

DUMMY01 Artificial equation for model: CGE

----VAR Q commodity output

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	1.1691	+INF	.
MAN	.	1.1004	+INF	.

----VAR W welfare or aggregate consumption

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	1.1196	+INF	.
HH-R	.	1.1411	+INF	.

----VAR P commodity price

	LOWER	LEVEL	UPPER	MARGINAL
AGR	.	0.9539	+INF	.
MAN	.	1.0134	+INF	.

----VAR PW expenditure price index

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	0.9960	+INF	.
HH-R	.	0.9772	+INF	.

----VAR PF factor price

	LOWER	LEVEL	UPPER	MARGINAL
LAB	.	0.8921	+INF	.

CAP . 1.1151 +INF .

----VAR YH household income

	LOWER	LEVEL	UPPER	MARGINAL
HH-U	.	156.1161	+INF	.
HH-R	.	111.5115	+INF	.

CGE model in MPSGE format
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```
****REPORT SUMMARY :    0  NONOPT
0          INFEASIBLE
0          UNBOUNDED
0          REDEFINED
0          ERRORS
```

436 ----PARAMETER repp simulation commodity price

	BASE	STOCK	LABOR
AGR	1.000	1.086	0.954
MAN	1.000	1.022	1.013

436 ----PARAMETER repq simulation commodity output

	BASE	STOCK	LABOR
AGR	100.000	106.923	116.906
MAN	140.000	159.040	154.050

436 ----PARAMETER repf simulation factor price

	BASE	STOCK	LABOR
LAB	1.000	1.161	0.892
CAP	1.000	0.929	1.115

436 ----PARAMETER rephe simulation household consumption

INDEX 1 = AGR

	BASE	STOCK	LABOR
HH-U	40.0	42.8	46.8
HH-R	60.0	64.2	70.1

INDEX 1 = MAN

	BASE	STOCK	LABOR
HH-U	100.0	113.6	110.0
HH-R	40.0	45.4	44.0

****REPORT FILE SUMMARY

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

EXECUTION TIME = 0.020 SECONDS 1.4 Mb WIN200-121

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USER: CEEPR-JP
MIT

G010822:1111AP-WIN
DC11

****FILE SUMMARY

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