

\$TITLE: M9-2.GMS: Two Country Large-Group Monopolistic Competition

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same data is used as used in M9-1, calibrated to monopolistic comp

| | YI | YJ | XMI | XMJ | NMI | NMJ | WI | WJ | CONI | CONJ | EHTI | ENTJ |
|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| PYI | 100 | | | | | | -100 | | | | | |
| PYJ | | 100 | | | | | | -100 | | | | |
| PXI | | | 100 | | | | -50 | -50 | | | | |
| PXJ | | | | 100 | | | -50 | -50 | | | | |
| FCI | | | | | 20 | | | | | | -20 | |
| FCJ | | | | | | 20 | | | | | | -20 |
| PSI | -40 | | -48 | | -12 | | | | 100 | | | |
| PSJ | | -40 | | -48 | | -12 | | | | 100 | | |
| PUI | -60 | | -32 | | -8 | | | | 100 | | | |
| PUJ | | -60 | | -32 | | -8 | | | | 100 | | |
| PWI | | | | | | | 200 | | -200 | | | |
| PWJ | | | | | | | | 200 | | -200 | | |
| MKI | | | -10 | -10 | | | | | | | 10 | 10 |
| MKJ | | | -10 | -10 | | | | | | | 10 | 10 |

\$offtext

PARAMETERS

SI sigma: elasticity of substitution among varieties
 TC trade costs on a gross basis (TC = 1 is costless trade)
 FC fixed costs
 E0 scaling parameter for calibration

ENDOWIS endowment of skilled labor in country i
 ENDOWIL endowment of unskilled labor in country i
 ENDOWJS endowment of skilled labor in country j
 ENDOWJL endowment of unskilled labor in country j
 MODELSTAT indicator whether or not model solved
 REALPUI real price of unskilled labor in i
 REALPUJ real price of unskilled labor in i
 REALPSI real price of skilled labor in j
 REALPSJ real price of skilled labor in j;

SI = 5;
 TC = 1.;
 FC = 20;
 ENDOWIS = 1;
 ENDOWIL = 1;
 ENDOWJS = 1;
 ENDOWJL = 1;

** E0: scaling parameter s.t. the consumer price index PW = 1 initially*

$E0 = (1.25^{**}(1-SI) + 1.25^{**}(1-SI))^{**}(1/(1-SI));$

DISPLAY E0;

POSITIVE VARIABLES

WFI welfare of country i
 WFJ welfare of country j
 XII production of X in i for sale in i
 XIJ production of X in i for sale in j

XJJ production of X in j for sale in j
 XJI production of X in j for sale in i
 YI production of Y in country i
 YJ production of Y in country j
 NI number of national firms in i (number of "varieties")
 NJ number of national firms in j
 PXI price of an X variety in country i
 PXJ price of an X variety in country j
 PY price of Y: domestic and world (no trade costs)
 PWI price of welfare (real consumer price index) in i
 PWJ price of welfare (real consumer price index) in j
 PEI price index for the X composite good in i
 PEJ price index for the X composite good in j
 PSI price of skilled labor in i
 PUI price of unskilled labor in i
 PSJ price of skilled labor in j
 PUJ price of unskilled labor in j
 CONSI consumer income in i
 CONSJ consumer income in j;

EQUATIONS

PRWI pricing equation for WI
 PRWJ pricing equation for WJ
 PRXI MC gte MR for X produced in i (same for all firm types)
 PRXJ MC gte MR for X produced in j (same for all firm types)
 PRYI MC gte PY for Y produced in i
 PRYJ MC gte PY for Y produced in j
 PRFI MC gte PFI for fixed costs in i

PRFJ MC gte PFJ for fixed costs in j
 DXII supply-demand for a X variety produced in i and sold in i
 DXJI supply-demand for a X variety produced in j and sold in i
 DXJJ supply-demand for a X variety produced in j and sold in j
 DXIJ supply-demand for a X variety produced in i and sold in j
 DY supply-demand for world production and consumption of Y
 DWI supply-demand for welfare in i
 DWJ supply-demand for welfare in j
 PINDEXI price index for the X composite in i
 PINDEXJ price index for the X composite in j
 SKLABI supply-demand for skilled labor in i
 UNLABI supply-demand for unskilled labor in i
 SKLABJ supply-demand for skilled labor in j
 UNLABJ supply-demand for unskilled labor in j
 ICONSI income-expenditure balance in i
 ICONSJ income-expenditure balance in j;

$$PRWI.. \quad ((PEI/E0)**0.5)*(PY**0.5) =G= PWI;$$

$$PRWJ.. \quad ((PEJ/E0)**0.5)*(PY**0.5) =G= PWJ;$$

$$PRXI.. \quad (PUI**0.4)*(PSI**0.6) =G= PXI*(1-1/SI);$$

$$PRXJ.. \quad (PUJ**0.4)*(PSJ**0.6) =G= PXJ*(1-1/SI);$$

$$PRYI.. \quad (PUI**0.60)*(PSI**0.40) =G= PY;$$

PRYJ.. (PUJ**0.60)*(PSJ**0.40) =G= PY;
 PRFI.. FC*(SI-1) =G= XII*40 + XIJ*40;
 PRFJ.. FC*(SI-1) =G= XJJ*40 + XJI*40;
 DXII.. XII*40 =E= PXI**(-SI)*(PEI**(SI-1))*CONSI/2;
 DXJI.. XJI*40/TC =E= (PXJ*TC)**(-SI)*(PEI**(SI-1))*CONSI/2;
 DXJJ.. XJJ*40 =E= PXJ**(-SI)*(PEJ**(SI-1))*CONSJ/2;
 DXIJ.. XIJ*40/TC =E= (PXI*TC)**(-SI)*(PEJ**(SI-1))*CONSJ/2;
 DY.. YI*100 + YJ*100 =E= CONSI/(2*PY) + CONSJ/(2*PY);
 DWI.. 200*WFI =E= CONSI/(PWI);
 DWJ.. 200*WFJ =E= CONSJ/(PWJ);
 PINDEXI.. PEI =E= (NI*PXI**(1-SI) + NJ*(PXJ*TC)**(1-SI))**(1/(1-SI));
 PINDEXJ.. PEJ =E= (NI*(PXI*TC)**(1-SI) + NJ*PXJ**(1-SI))**(1/(1-SI));
 SKLABI.. 100*ENDOWIS =E= 0.40*YI*100*PY/PSI
 + 0.6*NI*((XII+XIJ)*40 + FC)*PXI*(1-1/SI)/PSI;

```
UNLABI.. 100*ENDOWIL =E= 0.60*YI*100*PY/PUI
          + 0.4*NI*((XII+XIJ)*40 + FC)*PXI*(1-1/SI)/PUI;
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```
SKLABJ.. 100*ENDOWJS =E= 0.40*YJ*100*PY/PSJ
          + 0.6*NJ*((XJJ+XJI)*40 + FC)*PXJ*(1-1/SI)/PSJ;
```

```
UNLABJ.. 100*ENDOWJL =E= 0.60*YJ*100*PY/PUJ
          + 0.4*NJ*((XJJ+XJI)*40 + FC)*PXJ*(1-1/SI)/PUJ;
```

```
ICONSI.. CONSI =E= PSI*100*ENDOWIS + PUI*100*ENDOWIL;
```

```
ICONSJ.. CONSJ =E= PSJ*100*ENDOWJS + PUJ*100*ENDOWJL;
```

```
MODEL M63 /PRWI.WFI, PRWJ.WFJ, PRXI.PXI, PRXJ.PXJ, PRYI.YI, PRYJ.YJ,
           PRFI.NI, PRFJ.NJ,
           DXII.XII, DXJI.XJI, DXJJ.XJJ, DXIJ.XIJ, DY.PY, DWI.PWI, DWJ.PWJ,
           PINDEXT.PEI, PINDEXTJ.PEJ,
           SKLABI.PSI, SKLABJ.PSJ, UNLABI.PUI, UNLABJ.PUJ,
           ICONSI.CONSI, ICONSJ.CONSJ/;
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```
OPTION MCP=PATH;
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```
WFI.L = 1;
WFJ.L = 1;
PWI.L = 1;
PWJ.L = 1;
PEI.L = E0;
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```
PEJ.L = E0;  
CONSI.L = 200;  
CONSJ.L = 200;  
XII.L = 1;  
XIJ.L = 1;  
XJJ.L = 1;  
XJI.L = 1;  
YI.L = 1;  
YJ.L = 1;  
NI.L = 1;  
NJ.L = 1;  
PXI.L = 1.25;  
PXJ.L = 1.25;  
PY.L = 1;  
PSI.L = 1;  
PUI.L = 1;  
PSJ.L = 1;  
PUJ.L = 1;  
  
PY.FX = 1;  
TC = 1.;
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```
SOLVE M63 USING MCP;
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```
MODELSTAT = M63.MODELSTAT - 1.;
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* counterfactual: trade costs of 20%
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TC = 1.2;

SOLVE M63 USING MCP;

** counterfactual: country's identical except for size,
* positive trade costs (home market advantage)*

TC = 1.2;

ENDOWIL = 1.5;

ENDOWJL = 0.5;

ENDOWIS = 1.5;

ENDOWJS = 0.5;

SOLVE M63 USING MCP;

REALPUI = PUI.L/PWI.L;

REALPUJ = PUJ.L/PWJ.L;

REALPSI = PSI.L/PWI.L;

REALPSJ = PSJ.L/PWJ.L;

DISPLAY REALPUI, REALPUJ, REALPSI, REALPSJ;