

\$TITLE: M7-2.GMS: Monopoly with fixed costs

\$ONTEXT

<i>Markets</i>	/	<i>C</i>	<i>Production Sectors</i>			/	<i>Consumers</i>	
			<i>FC</i>	<i>Y</i>	<i>W</i>		<i>CONS</i>	<i>ENTR</i>
<i>PX</i>	/	100			-100	/		
<i>PY</i>	/			100	-100	/		
<i>PFC</i>	/		20			/		-20
<i>PW</i>	/				200	/	-200	
<i>PL</i>	/	-80	-20	-100		/	200	
<i>MK</i>	/	-20				/		20

\$OFFTEXT

PARAMETERS

SIGMA SIGMA: elasticity of substitution among varieties
 FC parameter setting the level of fixed costs
 ENDOWL endowment of labor
 INCOMEM monopoly profit share (markup revenues - fixed costs)
 INCOME income share of the "the people"
 MODELSTAT statistic indicating model solved: 0 = solved;

SIGMA = 9;

FC = 20;

ENDOWL = 200;

POSITIVE VARIABLES

X	Activity level for X (output per firm)
Y	Activity level of Y output
W	Activity level for welfare
PX	Price of X
PY	Price of Y
PW	Price index for utility (consumer price index)
PL	Price of labor
CONS	Income of the representative consumer
SHAREX	Share of X in consumption (value share)
MARKUP	Markup;

EQUATIONS

PRICEX	MR = MC in X (associated with X output per firm)
PRICEY	Zero profit condition for Y ($PY = MC$)
PRICEW	Zero profit condition for W ($PW = MC$ of utility)
MKT_X	Supply-demand balance for X (individual variety)
MKT_Y	Supply-demand balance for Y
MKT_W	Supply-demand balance for utility W (welfare)
MKT_L	Supply-demand balance for labor

INCOME National income
 SHX Share of X in expenditure
 MK Markup equation;

PRICEX.. $80 * PL = G = 100 * PX * (1 - MARKUP);$

PRICEY.. $100 * PL = G = 100 * PY;$

PRICEW.. $(0.5 * PX ** (1 - SIGMA) + 0.5 * PY ** (1 - SIGMA)) ** (1 / (1 - SIGMA))$
 $= G = PW;$

MKT_X.. $X * 100 = G = PX ** (-SIGMA) * (PW ** (SIGMA - 1)) * CONS / 2;$

MKT_Y.. $Y * 100 = G = PY ** (-SIGMA) * (PW ** (SIGMA - 1)) * CONS / 2;$

MKT_W.. $200 * W = G = CONS / PW;$

MKT_L.. $ENDOWL = E = Y * 100 + X * 80 + FC;$

INCOME.. $CONS = E = PL * ENDOWL + (100 * PX * X * MARKUP - PL * FC);$

SHX.. $SHAREX = E = 100 * PX * X / (100 * PX * X + 100 * PY * Y);$

MK.. $MARKUP = E = 1 / (SIGMA - (SIGMA - 1) * SHAREX);$

```
MODEL MONOPOLY /PRICEX.X, PRICEY.Y, PRICEW.W,  
                MKT_X.PX, MKT_Y.PY, MKT_W.PW, MKT_L.PL,  
                INCOME.CONNS, SHX.SHAREX, MK.MARKUP/;
```

```
OPTION MCP=PATH;
```

```
*          set benchmark values:
```

```
X.L = 1;
```

```
Y.L = 1;
```

```
W.L = 1;
```

```
PX.L = 1;
```

```
PY.L = 1;
```

```
PL.L = 1;
```

```
PW.L = 1;
```

```
CONS.L = 200;
```

```
SHAREX.L = 0.5;
```

```
MARKUP.L = 0.20;
```

```
* choose the price of good Y as numeraire
```

```
PY.FX = 1;
```

```
* check for calibration and starting-value errors
```

```
MONOPOLY.ITERLIM = 0;
```

```
SOLVE MONOPOLY USING MCP;
```

```
MONOPOLY.ITERLIM = 1000;  
SOLVE MONOPOLY USING MCP;
```

```
MODELSTAT = MONOPOLY.MODELSTAT - 1.;  
DISPLAY MODELSTAT;
```

```
INCOMEM = (MARKUP.L*PX.L*X.L*100 - PL.L*FC)/CONS.L;  
INCOME C = (PL.L*ENDOWL)/CONS.L;
```

```
DISPLAY INCOMEM, INCOME C;
```

** Counterfactual: contract the size of the economy*

```
ENDOWL = 100;
```

```
SOLVE MONOPOLY USING MCP;
```

```
INCOMEM = (MARKUP.L*PX.L*X.L*100 - PL.L*FC)/CONS.L;  
INCOME C = (PL.L*ENDOWL)/CONS.L;
```

```
DISPLAY INCOMEM, INCOME C;
```

** Counterfactual: expand the size of the economy*

```
ENDOWL = 400;
```

SOLVE MONOPOLY USING MCP;

INCOMEM = (MARKUP.L*PX.L*X.L*100 - PL.L*FC)/CONS.L;

INCOME C = (PL.L*ENDOWL)/CONS.L;

DISPLAY INCOMEM, INCOME C;