

Explanation of Demand Elasticities in POLYSYS

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The elasticities are read in the subprogram 'elast.for'.
The program calls and reads from the text file 'elast.txt';
This is where the elasticity values can be changed.

Table 1. Input file in elast.txt

DEMAND ELASTICITIES AND ADJUSTMENT COEFFICIENTS															
COLUMN WIDTH	CORN	G.S.	OATS	BARLY	WHEAT	SOYBN	COTTN	RICE	PNUTS	SGRCN	SGRBT	DRYBN	SBOIL	SMEAL	SUGAR
01-16	19-23	25-29	31-35	37-41	43-47	49-53	55-59	61-65	67-71	73-77	79-83	85-89	91-95	97-01	03-07
DIRECTOWNPRICE	-0.15	-0.50	-0.70	-1.00	-0.60	-0.30	-0.35	-0.26	0.00	0.00	0.00	-0.70	-0.10	-0.60	-0.05
LVTKPRICEINDEX	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00
SBEANMEALPRICE	0.05	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LVTKPRODINDEX	1.02	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
CORNPRICE	0.00	0.13	0.65	1.00	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOODDEMAND	0.00	0.00	0.00	0.00	-0.09	0.00	0.00	-0.33	-0.20	0.00	0.00	0.00	0.00	0.00	0.00
EXPORTDEMAND	-0.50	-0.45	-0.30	-0.40	-0.38	-0.60	-1.00	-1.00	0.00	0.00	0.00	0.00	-0.75	-0.85	0.00
INDUSTRIALDEM	-0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXPORTADJCOF	0.30	1.00	1.00	1.00	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FEEDADJCOEF	1.00	1.00	1.00	1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FOODEMADJCOEF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
INDEEMADJCOEF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Column Headers

CORN
G.S. = Grain Sorghum
OATS
BARLY
WHEAT
SOYBN = Soybeans
COTTN = Cotton
RICE
PNUTS = Peanuts (not used)
SGRCN = (not used)
SGRBT = (not used)
DRYBN = Dry Beans (not used)
SBOIL = Soybean Oil
SMEAL = Soybean Meal
SUGAR = Sugar

Row Headers

DIRECTOWNPRICE EGC(7,K) = Direct Own Price Elasticity
LVTKPRICEINDEX EGC(8,K) = Livestock Price Index elasticity
SBEANMEALPRICE EGC(9,K) = Soybean Meal Price Elasticity
LVTKPRODINDEX EGC(10,K) = Livestock production index elasticity
CORNPRICE EGC(11,K) = Corn price elasticity in other crops ("Cross price elasticity")
FOODDEMAND EGC(12,K) = Food Demand elasticity
EXPORTDEMAND EGC(14,K) = Export Demand Elasticity
INDUSTRIALDEM EGC(13,K) = Industrial Demand Elasticity (used only in corn)
EXPORTADJCOF AJC(4,K) = Export Adjustment Coefficient Elast (used for lag value)
FEEDADJCOEF AJC(10,K) = Feed Adjustment Coefficient Elast
FOODEMADJCOEF AJC(11,K) = Food Demand Adjustment Coefficeint Elast
INDEEMADJCOEF AJC(9,K) = Industrial corn demand adjustment coefficient

Used in subprogram GRAINS.FOR in the following equations:

These are solved simultaneously until no change from iteration before (ie equilibrium reached)
Variable 'K' cycles through all the crops, so the following equations are solved for all crops

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C--      FEED DEMAND
          C(I,10,K) = B(I,10,K) * ( 1.0
1          + EGC(07,K) * (C(I,09,K)-B(I,09,K)) / B(I,09,K)      !price change
2          + EGC(08,K) * (A(I,20,3)-AB(I,20,3)) / AB(I,20,3)    !feed price index
3          + EGC(09,K) * (CRMR(I) - CRMRB(I)) / CRMRB(I)        !Soy crush margin
CC      4          + EGC(10,K) * (A(I,5,2) - AB(I,5,2)) / AB(I,5,2)
5          + EGC(10,K) * (SAU(I,13,2)-SAUB(I,13,2)) / SAUB(I,13,2) !lvstk prod index
6          + EGC(11,K) * (C(I,09,1) - B(I,09,1)) / B(I,09,1)    !corn price change
          ) + AJC(10,K) * (C(L,10,K) - B(L,10,K))                !lag feed demand

C--      FOOD DEMAND
          IF(K==5.OR.K==8)C(I,11,K) = B(I,11,K) * (1.0
1          + EGC(12,K)*(C(I,09,K)-B(I,09,K))/B(I,09,K)          !price change
2          ) + AJC(11,K) * (C(L,11,K) - B(L,11,K))              !lag food demand

C--      INDUSTRIAL DEMAND
C--      CORN                                |13 OWN PRICE
          C(I,40,1) = B(I,40,1) * (1.0
1          + EGC(13,1)*(C(I,09,1)-B(I,09,K))/B(I,09,1)          !price change
2          ) + AJC(09,1) * (C(L,40,1) - B(L,40,1))              !lag indust corn dmd

C--      ***** EXPORT DEMAND*****          |14 OWN PRICE ELASTICITY
          C(I,04,K) = B(I,04,K) * (1.0
1          + EGC(14,K) * (C(I,09,K) - B(I,09,K)) / (B(I,09,K)*XB(I,36,K)) !own price change
2          + EGC(15,K) * (C(I,09,1) - B(I,09,1)) / B(I,09,1)      ! corn price change
3          ) + AJC(04,K) * (C(L,04,K) - B(L,04,K))                !lag export demand

*EGC(15,k) zero except for wheat. Set within ELAST.FOR

C--      *****                                |08 EFFECTIVE SUPPLY
C--      PRICE                                |13 TOTAL DEMAND
C--      *****
C--
          C(I,09,K) = B(I,09,K) * (1.0
1          + EGC(06,K) * (((C(I,08,K) - B(I,08,K))
2          - (C(I,13,K) - B(I,13,K))) / B(I,13,K)))              !effective supply
                                                                    over total use

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*EGC(06,K) is the 'price flexibility'. The lower the 'stock to use ratio' the more flexible EGC(06,k) will be (i.e. a more negative number).

Price flexibility schedule can be found in FLEXGR.FOR