

California sugarbeet growers respond quickly to price

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The U. S. sugar industry has been subject to substantial price variability since Congress voted not to extend the Sugar Act on June 5, 1974. That vote ended over 40 years of economic protection for the domestic industry and moved price determination from government formula to market forces, effective January 1, 1975. After reaching record highs in late 1974, U. S. sugar prices declined during 1975, 1976, and 1977 to levels below production costs for many producers. A number of beet sugar processing plants closed and farmers switched from beets to other crops. To date, repeated industry efforts have failed to produce long-term domestic legislation for sugar

that is independent from other agricultural commodities as was the Sugar Act of 1948.

The U. S. government responded to low sugar prices under provisions of the Food and Agriculture Act of 1977, with tariffs, duties, import fees, a sugar loan program, and direct producer payments. Without these actions, domestic returns would have been lower and acreage reductions greater than was the case. Reductions in world sugar supplies led to increasing world and domestic sugar prices in 1979 and early 1980. As a result, the U. S. import duty on raw sugar was reduced from 2.8125 cents per pound to the legal minimum of 0.625 cent per pound effective February 1, 1980.

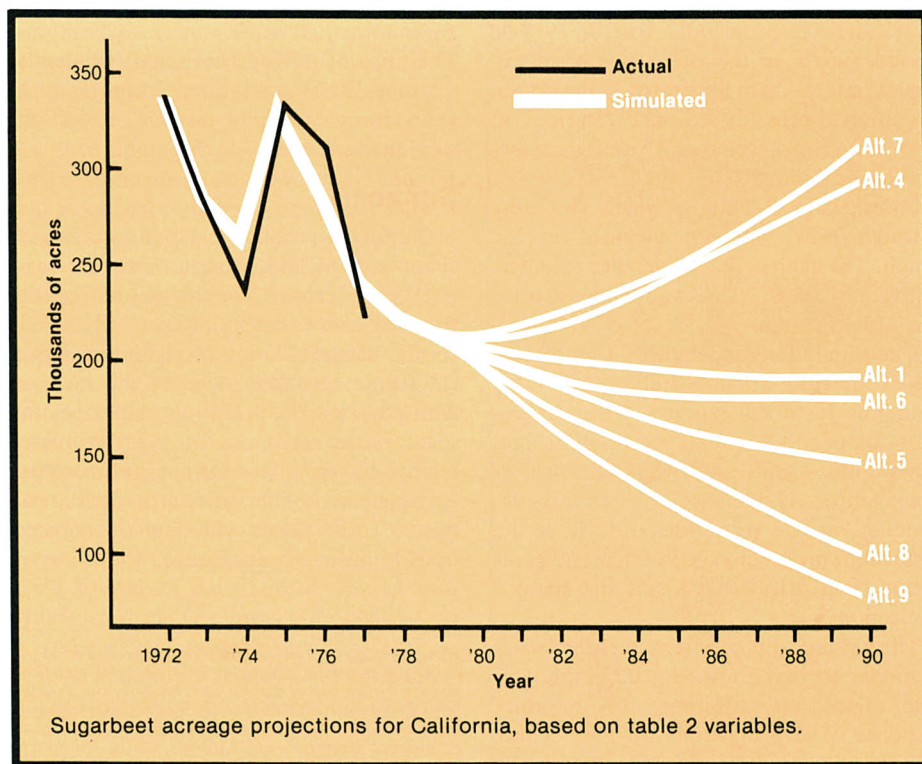
Sugarbeets are a major source of domestic sugar, accounting for about 30 percent of 1978 U. S. sugar consumption. This share has varied from 27 to 35 percent since 1974. Because sugarbeets are an annual crop, growers can respond quickly to changing price relationships between beets and alternative crops. U. S. sugarbeet harvested acreage decreased from over 1.5 million acres in 1975 to 1.17 million acres in 1979, a 26 percent reduction. The decrease varies by region depending on alternative crops available and other factors. In California, where there are a number of alternative crops, harvested sugarbeet acreage decreased 37 percent from 326,000 acres in 1975 to 206,000 acres in 1979.

Accurate empirical estimates of the impact of factors affecting sugarbeet acreage and production are needed to assess alternative policy actions and changing economic conditions. This article summarizes results of an economic study of U. S. and California sugarbeet acreage response. Acreage for nine California districts is projected to 1990 under alternative assumptions regarding annual changes in the prices of sugar and of competing crops. We also project district acreages given sugar prices ranging from 19 to 30 cents per pound.

Many factors can influence a producer's decision to allocate acreage between sugarbeets and alternative crops. Our basic approach follows that of other studies of acreage or production response for annual crops. In the model specified and estimated, planted acreage of sugarbeets for each California district and year is a function of the expected price of sugarbeets, expected prices of alternative crops, acreage allotments, processing capacity, and technological change. Attempts to include variables for crop rotation practices, input costs, and risk were generally unsuccessful.

Previous research specifically related to sugarbeet acreage response has incorporated information on other field crops. This practice was followed for the California study after attempts to include vegetable crops proved unsatisfactory. The district-specific prices of alternative crops are expressed as functions of the policy target prices of the Food and Agriculture Act of 1977 for crops under its provisions.

The district designations and the alternative crops selected for inclusion in the analysis on the basis of econometric results are shown in table 1. Prices for crops included were often highly correlated with



Sugarbeet acreage projections for California, based on table 2 variables.

TABLE 1. District Designations and Alternative Crops Included in the Analysis, California Districts II-X

District	Share of 1977 sugarbeet		Counties included	Alternative crops
	Acreage	Production		
II	12.9	14.0	Alameda, Contra Costa, San Joaquin, Stanislaus	Barley
III	11.4	13.6	Sacramento, Solano	Barley
IV	9.3	9.6	Yolo, Sutter	Wheat, processing tomatoes
V	9.7	8.8	Tehama, Butte, Colusa, Glenn	Wheat, processing tomatoes
VI	13.9	14.0	Merced, Madera, Fresno, Kings, Tulare	Barley
VII	7.6	9.8	Santa Clara, Santa Cruz, San Benito, Monterey	Barley
VIII	1.0	1.0	San Luis Obispo, Santa Barbara, Ventura	Dry beans
IX*	26.8	21.5	San Bernardino, Imperial, Riverside	Grain sorghum
X	7.4	7.7	Kern, Los Angeles	Grain sorghum

*Planted fall 1976.

TABLE 2. Alternative Real Price Scenarios Used for Regional Sugarbeet Acreage Projections, 1978-1990

Alternative	Sugar prices*	Alternative crop prices*
1	constant	constant
2	decreasing at 7%	decreasing at 3%
3	decreasing at 3%	decreasing at 5%
4	constant	decreasing at 5%
5	decreasing at 5%	constant
6	increasing at 5%	increasing at 5%
7	increasing at 5%	constant
8	constant	increasing at 5%
9	decreasing at 5%	increasing at 5%

* Annual percentage change in real price (base year = 1977). Alternatives are projected through 1990, except for 2 and 3, which run through 1981.

TABLE 3. Projected 1978 Planted Acreage by California District for Various Chicago-West Wholesale-Level Market Prices

Market price cents/lb	California district									California total
	II	III	IV	V	VI	VII	VIII	IX	X	
	<i>planted acreage</i>									
19	28,600	25,400	28,200	20,800	57,100	12,100	400	66,900	35,800	275,300
20	29,400	25,700	28,700	21,300	58,100	13,000	1,000	67,300	35,900	280,400
22	30,900	26,200	29,500	22,100	60,200	14,800	2,100	68,000	36,300	290,100
24	32,500	26,800	30,300	22,900	62,400	16,700	3,200	68,700	36,600	300,100
26	34,100	27,300	31,200	23,800	64,500	18,500	4,300	69,400	37,000	310,100
28	35,700	27,900	32,000	24,600	66,600	20,400	5,500	70,200	37,400	320,300
30	37,300	28,400	32,800	25,400	68,800	22,200	6,600	70,900	37,700	330,100

prices for other crops in the region. When this occurred, the crop that provided the best statistical results was chosen.

Estimation and projections

Acreage response equations were estimated for each of nine California districts. Over 40 equations were estimated and linked together to form the complete model, which was then used to project sugarbeet acreage and beet sugar production. The model was verified over the period of estimation with very good results.

California's nine sugarbeet producing districts have different estimated elasticities of acreage response, with respect to both the price of sugarbeets and prices of alternative crops. Thus, sugar and alternative crop price changes have differential regional impacts. Our results suggest that changes in the price of sugar would lead to larger percentage changes in planted acreage in districts II, VI, VII, VIII, and X than in districts III, IV, V, and IX. Alternative crop price changes can be expected to show the larger percentage impacts in districts VI, VII, VIII, and X, whereas districts III, V, and IX appear to be least affected.

The simulation model can be used to evaluate the district impact of various sugar and alternative crop price scenarios. Table 2,

for example, lists nine price scenarios that have been evaluated. The first year for the simulation model was specified as 1973. Acreage projections based on actual price levels begin in 1974 and continue through 1978. Acreage projections for the 1979-90 period, based on the alternative price scenarios in table 2 are illustrated in the graph. We use real prices based on 1977 price and cost conditions, removing price increases due to inflation.

Alternatives 2 and 3, which run only through 1981, are not included in the graph. The aggregate 1981 acreage for alternative 2 is 203,108 acres and for alternative 3 is 213,951 acres.

The simulation model yields a set of projected acreages that differ substantially from the historical pattern. District acreages demonstrate annual variations, sometimes quite significant, while the projections uniformly increase or decrease, depending on the price scenario. It is the assumed uniform change in sugar and competing crop prices that yields the smooth projections.

The pattern of projections in each district is similar to that shown in the graph, but with significant differences in absolute response. The projections do not include actions of processors. Decreasing relative

real prices for sugar, as in alternatives 5, 8, and 9, could result in plant closings, which could lead to further acreage reductions.

Another calculation that may be of interest is the regional acreage under alternative sugar prices, given 1978 market conditions. The price of refined beet sugar (wholesale, Chicago-West) was varied from 19 to 30 cents per pound and acreage projections were made for each district (table 3).

Summary

California producers respond quickly to changes in the price of sugarbeets relative to alternative crops. The magnitude of the response also varies by district within California. The simulation results indicate that California sugarbeet acreage will increase with constant or increasing real prices for sugar if the real price of sugar increases relative to real prices for alternative crops. Any increase in alternative crop prices relative to sugar prices will result in reduced California sugarbeet acreage.

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