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UPDATE

Agricultural and Resource Economics

Have Expenditures to Advertise California Almonds Been Effective?

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by John M. Crespi and Richard J. Sexton

The Almond Marketing Order, established in 1950, provides the industry with various tools to influence the demand and supply of almonds with the goal of increasing grower returns. Among its provisions, the Order authorizes the industry to undertake advertising and promotion. Funds for this purpose are collected through an assessment on almond handlers. The Order allows for (and programs have generally included) a provision for handlers to receive full or partial credit on their assessment for advertising their own products. The industry has also conducted a generic advertising program. The entire advertising program was suspended for crop years 1994/95 – 1996/97 due to litigation.

This study evaluates the economic impacts of advertising and promotion expenditures funded under the almond marketing order and provides an estimate of the cost to the industry of suspending its program for the indicated years. We ask whether the advertising programs conducted under the almond order have been effective in increasing demand for almonds in the United States, and whether the expenditures have been cost effective in the sense of yielding benefits to growers in excess of the costs borne by them.

Our study focused on the U.S. market for almonds, where most almond promotion expenditures have been directed. However, because about two thirds of each year's crop is exported nowadays, our simulation model also takes account of the export market in determining price impacts due to almond promotion. We specified a model where per-capita quantities of almonds consumed annually in the United States were represented as a function of the real (deflated) price of almonds,

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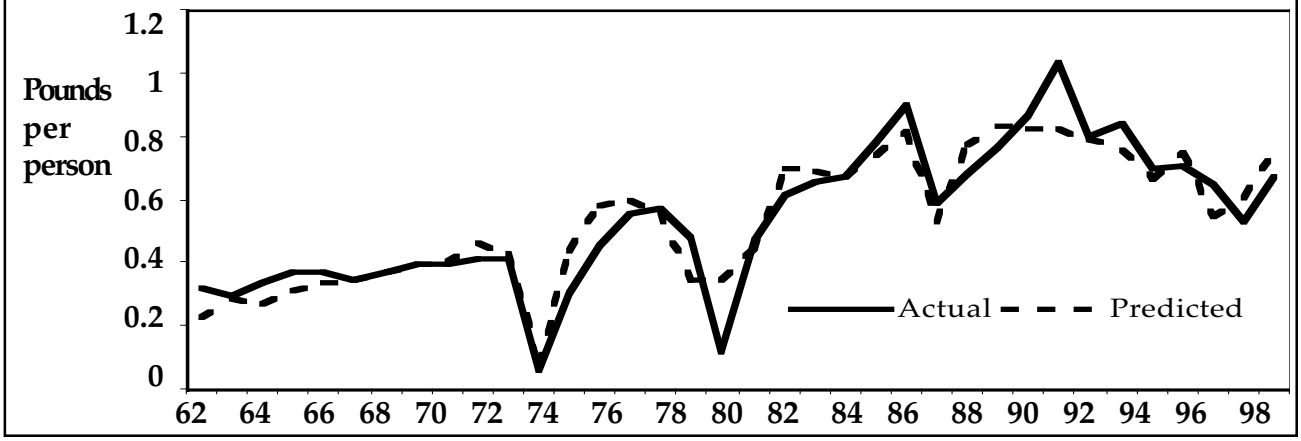
The Next WTO Round: What Does it Mean for California Agriculture?
by Colin A. Carter

Figure 1. U.S. Per-capita Annual Almond Consumption – Actual versus Fitted Values, 1962/63-1997/98



real consumer income, and the real annual expenditure on almond promotion.

An increase in the price of almonds should lead to a decrease in almond consumption, while an increase in total money income should lead to an increase in almond consumption. Successful promotions will increase demand, but unsuccessful promotions will have little or no effect on demand.

Data for the model consisted of 36 annual observations for crop years 1962/63 through 1997/98. Promotion expenditures consisted of the sum of the amounts spent on advertising by the Almond Board of California (ABC) and Blue Diamond Growers (BDG), the leading marketer and dominant advertiser of almonds in the industry. For most of the time period we studied, almond handlers like BDG were allowed to satisfy at least a portion of their promotional assessment by advertising their own products. Thus, promotion funded under the auspices of the almond order appropriately includes the amount of assessments credited to BDG and other handlers for the purposes of advertising their own products.

The estimated model explained about 85 percent of variation in almond consumption from 1962/63 – 1997/98. Figure 1 compares actual U.S. per-capita almond consumption with consumption predicted by the model for the 1962/63 – 1997/98 crop years. The elasticity of demand with respect to price evaluated at the means of the sample was estimated to be about –0.7, implying that a 10 percent increase in the price of almonds results in a 7 percent decrease in almond consumption. The elasticity of demand with respect to promotion expenditures was estimated to be 0.13, indicating that a ten percent increase in annual promotion expenditures results in a 1.3 percent increase in almond consumption. Finally, the estimate of the elasticity of demand with respect to income was about 0.7, indicating that consumption increases with an increase in consumer income, but the increase is less than proportional.

Simulation Model and Benefit-Cost Analysis

The estimated model of U.S. demand for almonds was used to measure the gross and net benefits to the California almond industry from its expenditures on promotion. The demand model provides an estimate of how quantities of almonds sold in the U.S. increase in response to a given increase in promotional expenditures, holding prices and other variables constant. However, the increase in price following a promotion-induced shift in demand is an important source of the benefits from almond advertising. To evaluate the effects of almond promotion properly, we must combine the estimated demand model with a model of the supply of almonds to the U.S. market.

The diagram in figure 2 (on page 7) illustrates the supply and demand relationships for a typical year. The curve labeled S represents the residual supply curve for almonds to the domestic (U.S.) market. At higher prices more almonds are available domestically, while at lower prices, larger quantities of almonds are diverted to the export market. The curve labeled D_1 represents the demand curve—at higher prices, consumers purchase a smaller quantity of almonds than at lower prices, holding promotion expenditures and other factors constant. The market equilibrium occurs at point E. The market price adjusts until the quantity demanded and the quantity supplied are equated at price P.

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Making Sense of California Milk Standards and Prices

by L.J. (Bees) Butler

The recent furor over California fluid milk prices has sparked a number of newspaper articles and TV news spots that, to many, are confusing and potentially misleading, and seem to perpetuate a widespread misunderstanding about milk standards and prices in California.

Dairying is important in California. We produce almost 20 percent of the total milk produced in the U.S. here with a wholesale value around $4 billion. In dollar terms, milk is the number one agricultural commodity produced in California. What many people do not know is that California has long had standards for fat and solids content in fluid dairy products that differ from the rest of the country (see accompanying table). California standards require fluid milk to be fortified by replacing removed fat with solids-not-fat (either a powdered or condensed milk), such that total solids are at least 12%. As a result, California fluid milks are more consistent and richer in taste than those of other states where fat is removed without an equivalent amount of solids replacing it. Taste tests have shown that consumers prefer this richer, more consistent product resulting from California standards.

California milk standards were born out of a compromise between producers and processors in the early 1960s. At that time, processors wanted statutory authority to market a lowfat milk product (prior to 1962 only two fluid milk products were defined – whole milk and skim milk). But since producers were paid on the basis of the fat content of their milk, they were afraid of what reduced fat products would do to their Class 1 sales of milk fat. Obviously, if the extracted milkfat were not sold at Class 1 prices, it would be sold at the lower priced Class 4a (butter) or 4b (cheese) price. It was agreed therefore that producers would get paid on both fat and solids-not-fat (SNF) content (known as multiple component pricing, or MCP) and that the 12% standard (10% SNF, 2% milk fat, or later 11% SNF and 1% milk fat) would become the standard for California milk.

However, among the many provisions of the Nutrition Labeling and Education Act (NLEA) of 1990 is a requirement that standards of identity be uniform in all states. This, in effect, preempted California milk standards, no longer allowing them to differ from those prescribed by the federal government. For a long time, many in the U.S. dairy industry have believed that the

Table 1. Federal and California Minimum Standards for Fluid Milk Products

Product	Federal	California
Whole milk		
Milkfat	3.25%	3.5%
Solids-not-fat	8.25%	8.70%
Protein	8 g	8 g
Calcium	290 mg	310 mg
Sodium	120 mg	130 mg
Calories	140 Kcal	150 Kcal
Lowfat milk		
Milkfat	0.5-2%	2%
Solids-not-fat	8.25%	10%
Protein	8 g	10 g
Calcium	290 mg	350 mg
Sodium	120 mg	150 mg
Calories	120 Kcal	140 Kcal
Extra-light milk		
Milkfat	0.5-2%	1%
Solids-not-fat	8.25%	11%
Protein	8 g	10 g
Calcium	290 mg	320 mg
Sodium	120 mg	160 mg
Calories	100 Kcal	120 Kcal
Nonfat Milk		
Milkfat	< 0.5%	<0.25%
Solids-not-fat	>8.25%	>9%
Protein	8 g	8 g
Calcium	290 mg	320 mg
Sodium	120 mg	130 mg
Calories	90 Kcal	80 Kcal

Source: National All-Jersey Inc., Equity Newsletter, *Vol. XVI, No. 4, August 1991.*

higher (more nutritious) California standards should become the national standard. However, processors in other states opposed this change when it was proposed in the 1990 Farm Bill.

California applied for an exemption from the lower federal milk standards in 1991, arguing that federal minimum nutritive (protein and calcium) standards are significantly lower for every fluid milk product, and the federal fat standard for nonfat milk is double the California standard. While the FDA has never ruled on the California exemption, the 1996 Farm Bill (FAIR Act of 1996) specifically exempts California from the federal milk standards and allows California to maintain its higher standards. These differences in milk standards have raised a number of issues that are both misleading and divisive.

Retail Milk Prices

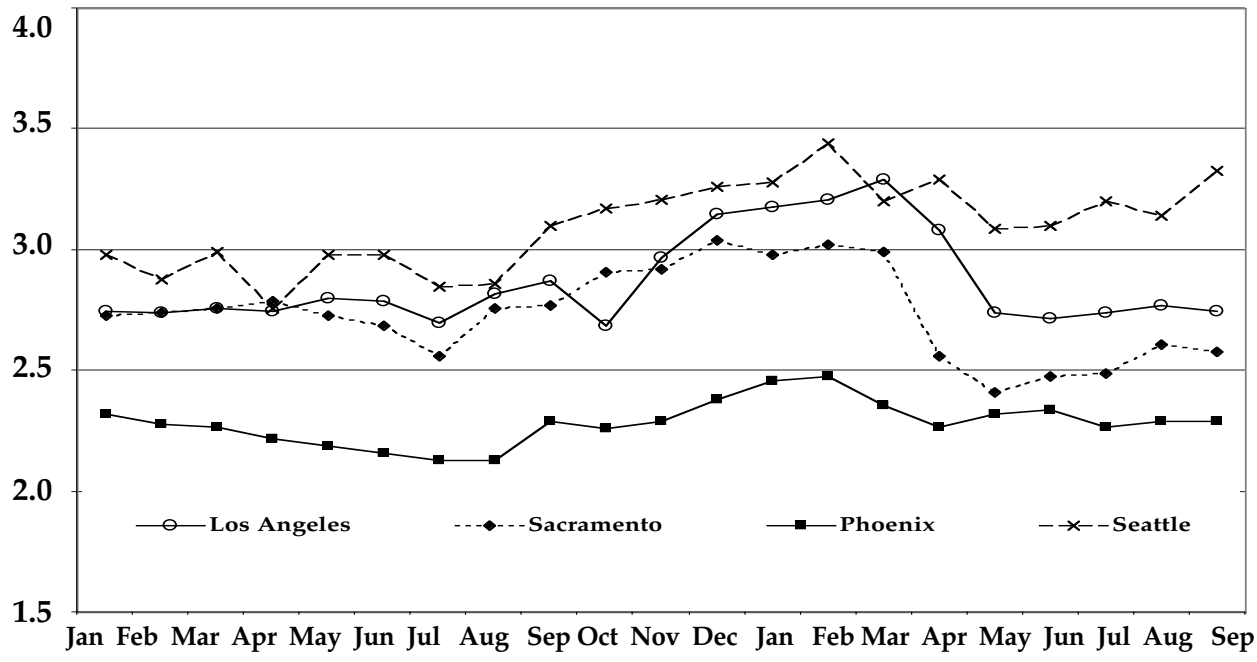
Many people have the impression that milk in California is more expensive than anywhere else in the U.S., and that much of this expense is due to the California fluid milk standards. One recent newspaper article (Los Angeles Times, December 9, 1999) argued that November California retail prices were $0.60 - $1.20 per gallon more expensive than the national average, and that this was due to California's higher milk standards.

First, as the accompanying graphic shows, California retail milk prices are far from the highest in the nation. While it is true that retail milk prices in Phoenix and Salt Lake City are often lower than California, milk prices in Portland, Seattle, New York, Miami and Washington D.C. are the same or much higher.

Second, since the fortification process involves the addition of extra solids to fluid milk, some fluid milks in California are naturally going to be slightly more expensive than non-fortified milk in other states. One can estimate from the California fortification allowances that it costs on average, about 16 - 20 cents per gallon to fortify milk to California standards. Some California consumer groups have argued that this added expense denies poor people the nutrition that milk affords them, and that out-of-state milk should be allowed to enter the state, or alternatively, that the state should change the standards. But the extra 16 – 20 cents per gallon for fortification is a relatively minor factor influencing fluid milk prices at retail.

Third, some people have criticized California milk prices because of the minimum below-cost retail price controls that exist. Minimum below-cost retail prices are based on a minimal markup of retail prices from farm prices. It is illegal to sell milk at retail below this minimal markup from the farm price.

Figure 1. 1998-99 Milk Prices at the Retail Level ($ per gallon)



Minimum below-cost retail price controls are a consequence of previous minimum wholesale and retail price controls. Between 1937 and 1976, California, along with 19 other states, imposed minimum retail and wholesale prices for milk. According to the USDA (1955), the rationale for retail price controls are

> to control price cutting and 'destructive' competition, to protect against producer price cuts and losses caused by dealers' bankruptcies; to protect a state's producers and distributors against competition from low-priced out-of-state milk, to maintain distributor margins that will enable the industry to pay reasonable prices to producers; to prevent price manipulation by distributors for the purpose of strengthening their competitive position, to check rebates and other advantages given customers with exceptional bargaining powers and to make determination of resale prices public rather than a matter for secret understanding.
>
> (USDA-AMS, Report # 98, 1955).

Most states, including California, have discontinued such controls, but in 7 or 8 states, including California, minimum below-cost retail price controls still exist in State legislation. They are intended to prevent large supermarket chains from driving smaller competitors out the milk market through predatory pricing.

While minimum below-cost price controls are anachronistic, and do appear to be anti-competitive, the fact is that retail prices rarely get anywhere near the minimum markup. According to the California Department of Food and Agriculture (CDFA) the minimum below-cost rule was last enforced in 1989, and even then, the case was dismissed.

Finally, many people are under the illusion that milk prices are "set" every month by some entity associated with the CDFA. Some newspaper articles imply that there is some person or persons at the CDFA who carefully analyze the milk situation in California each month and decide what the milk price will be, then "announce" the prices for that month! Nothing could be further from the truth.

Bearing in mind that milk prices must satisfy both milk producers (who want a higher price) and processors (who want a lower price), milk prices in California are established by formulae that are based on ***national*** markets for butter, nonfat dry milk powder and cheese. Thus, milk prices are determined by national commodity markets, not by some government entity that arbitrarily decides monthly milk prices.

Nutritive Value of Milk

The nutritive value of milk as a safe and healthy food suitable for the American diet has been recognized for decades and promoted as such by the U.S. government. However, recently, several special interest groups have challenged the notion that milk is a healthful food suitable for inclusion in the USDA's Food Guide Pyramid. Specifically, a group known as the Physicians for Responsible Medicine (although only 5,000 of their 100,000 membership are physicians, according to their Web site) have criticized the forthcoming U.S. Dietary Guidelines for "promoting the myth" that dairy foods play an important role in providing calcium for the American diet. They claim that there are other available sources of calcium and vitamins without consuming dairy products. While this may be true, according to the USDA, 75% of the available calcium in the food supply is found in dairy products. How do we reconcile this apparent confusion?

The fact of the matter is that although there are alternative sources of calcium and vitamins, they are not as available, and are not as convenient as the proponents of alternative sources would have us believe. According to the Center for Food and Nutrition Policy at Georgetown University, alternative sources of calcium can be found primarily in 3 vegetables: kale, broccoli and collard greens. In order to meet the daily adequate intake of calcium for the general population (1000 mg), an individual would have to consume anywhere from 3– 7 cups of collard greens, 7–11 cups of broccoli, or 5 – 11 cups of kale per day.

As is clear in Table 2, while alternative sources of calcium exist, the sheer volume and fiber bulk in the quantities needed would likely discourage such an intake regimen. And compared to milk, the alternatives are not nearly as convenient.

Table 2. Calcium Sources, Content and RDA Requirements

Source of Calcium	Calcium content per cup	Cups required to meet RDA
Kale	94 - 179 mg	5.6 - 10.6
Broccoli	94 - 135 mg	7.4 - 10.6
Collard Greens	148 - 357 mg	2.8 - 6.8
Milk (Federal Std.)	290 mg	3.5
Milk (Calif. Std.)	310 - 350 mg	2.8 - 3.2

Sources: Center for Food and Nutrition Policy, Georgetown University, Washington D.C.

State Trade Barriers

A number of out-of-state fluid milk processors have attempted to sell fluid milk in California that meets the lower federal standards, but does not meet the higher California standards. They argue that the NLEA preempts California standards. Since the California standards are mandated by statute, the California Department of Food and Agriculture has had to order such milk to be withdrawn for sale in California. This, in turn, has prompted several court challenges to California's statutes and higher standards. Until recently, the courts have ruled in California's favor, and California has been able to maintain its higher standards for milk. However, in August 1999, a San Diego Appeals Court decided that California law could not ban federal standard milk from entering the state. State officials have asked the California Supreme Court to review the Appeals Court ruling.

This issue is a particularly tricky one for the California dairy industry. On the one hand, California standards for milk provide consumers with a richer, more nutritious and more consistent milk than do the lower federal standards. The fat and SNF content of milk changes seasonally and by geographic location. If it is not fortified then its consistency changes week-to-week, month-to-month, potentially leading to a loss of consumer confidence in milk. On the other hand, disallowing the sale of the lower federal standard milk from other states can be construed as an unfair trade barrier. Some state legislators have argued that consumers should have a choice of which milk they want to purchase, and that the increased competition created by allowing the lower federal standard milk to be sold in California would help boost consumption and result in an increased intake of calcium. Theoretically, these arguments are valid. But what would actually occur is unknown. There is no evidence that consumers are reducing milk consumption because of price, and certainly not because they prefer the lower standard milk. Nor is there any evidence that consumers would increase their calcium intake through increased competition in milk. Since the lower federal standard milk has less calcium, consumers would have to purchase *more* milk to meet their intake requirements. Nor is it clear that milk *or calcium* intake is highly price responsive. Numerous surveys carried out over the last few years have shown that milk prices vary between retail outlets (not just in California, but all over he nation) by as much as $2.50+ per gallon. Lower-than-average priced milk is available in most cities and towns throughout the nation. What is clear is that most consumers do not take much notice of the price they pay for milk, as long as it is reasonable. Most consumers do not go out shopping specifically for the cheapest milk available. They tend to purchase it at the supermarket along with the other staples they require.

Impacts

Should California's higher milk standards be abolished and replaced with lower federal milk standards? Abolishing the standards themselves would reduce prices, but not nearly by as much as some groups would have us believe. If milk were not fortified to California standards then we could expect prices to drop by about 16 – 20 cents per gallon. But the richer, more consistent and more nutritious milk would be gone, and the extra milk required to obtain the daily requirements of calcium and other nutrients would probably make the price reduction a wash.

Although it would not be illegal for California to continue to produce the richer milk that consumers prefer, the issue clearly poses a dilemma for the industry. First, approximately 50 million pounds of solids-not-fat used for fortification (worth about $50 million), and a significant amount of fat (from the lower federal fat standards) would be displaced, which would flood dairy products markets. Most of this surplus would be purchased by the government run Commodity Credit Corporation (with taxpayer revenues) under the current price support program. Thus, taxpayers would foot a large chunk of the bill. Second, California consumers, it is estimated, would have to pay significantly more than this to obtain the nutrition equivalent to that offered in milk. Third, the effect of the displaced solids and fat would likely depress the price of milk for *all* U.S. dairy producers, and would be unduly burdensome to California producers. And finally, dual standards would likely create considerable confusion for consumers.

It would not be any great loss to processors if fortification of fluid milk were replaced by the lower Federal standards. This would reduce the cost of producing California fluid milk, resulting in California processors being more competitive with surrounding states. At the same time, a large volume of nonfat solids would be released onto the market, reducing the price of all milk in the U.S. And the losers would be California consumers and all U.S. producers.

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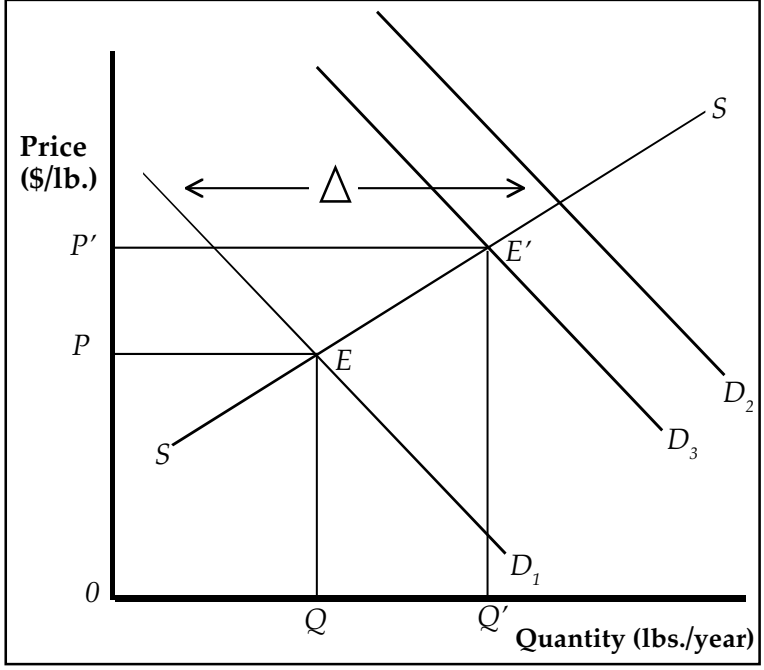
Almonds—*continued from page 2*

effect of an increase in promotion is illustrated by the outward shift in the demand curve to D_2. The demand model allows us to estimate the horizontal distance of the demand shift in the U.S. market needed to bring forth the additional quantities to the U.S. market to satisfy the increased demand. Second, an increase in assessments is needed to pay for the additional promotion expenditures. This cost has the effect of shifting demand down by the amount of the additional per-unit assessment—the curve D_3 in Figure 2. The new equilibrium is represented by the point E', where D_3 intersects S. Price and quantity both increase to P' and Q'.

Fig 2. Conceptual Supply and Demand Model



To generate a model of the supply of almonds to the U.S. market, we begin by noting that newly planted almond trees do not begin bearing for three to four years. Harvest is determined primarily by yield of the bearing acreage, which is a function of weather conditions and is largely unaffected by the current year's price. Thus, within this time frame price has essentially no effect on total supply. We chose to examine the promotion program over a recent four-year period so that we could treat bearing acreage as fixed and total harvest as unaffected by the current market price.

The supply of almonds to the U.S. market in a given year consists of total supply (harvest + carry in) minus the amount that would be exported at various prices. We calibrated residual supply curves for the U.S. market using estimates of the export demand for almonds provided in an earlier study of the industry by researchers from the ARE Department. We used a range of choices for this elasticity (0.86, 1.50, and 2.56) to examine the degree to which our results are sensitive to choices of this parameter, where, admittedly, our knowledge is less than precise.

By equating supply and demand and solving for market equilibrium, we obtained values of actual prices and predicted quantities. We then simulated counterfactual scenarios using a hypothetical, marginal increase in the amount of promotion and associated assessment in each year for 1990/91 to 1993/94 of 1.10 times the actual amount of promotion. Because the program was suspended due to litigation from 1994/95 through 1996/97, the 1990/91 – 1993/94 period represented the most recent four years of promotion activity that were in some sense "normal" from the industry's perspective. The differences between the actual and counterfactual scenarios were then used to calculate measures of the marginal net benefits to producers from the joint increase in promotion expenditures and assessments.

For our lower bound, residual supply elasticity of 0.86, the benefit-cost ratio for a ten-percent increase in promotional expenditure was estimated to be 6.88, i.e., a marginal dollar expended on promotion yields a return to growers of $6.88. As the supply elasticity rises, producers receive progressively smaller benefits from a given demand increase because price rises less for a given demand shift. Hence, the benefit-cost ratio falls from 6.88 to 4.51 when the midrange elasticity of 1.5 is used, and finally to 2.87 when the upper bound of the residual supply elasticity of 2.56 is used.

Financial Impacts from the Promotion Program's Suspension

Suspension of the industry's promotion program from 1994/95 through 1996/97 provides a natural experiment for assessing the impact of the absence of advertising on the almond industry. For the three years before the suspension period, the average, effective assessment was $0.02091 per pound (kernel weight). Using this assessment rate with the harvests for the 1994/95 through 1996/97 period would have resulted in the following levels of promotion: $15.3 million in 1994/95, $7.7 million in 1995/96, and $10.6 million in

1996/97. Actual promotion levels were $5.3 million, $4.2 million, and $2.2 million, respectively. Using these counterfactual estimates of promotion and the corresponding assessment rate for the years 1994/95 through 1996/97 in the market equilibrium model allows us to compare estimates of growers' profit obtained using the actual promotion levels and assessments with those obtained under the counterfactual levels.

Table 1 summarizes the results. The accumulated loss from the suspension of the promotion program is estimated to be between 89.62 and 234.21 million dollars, depending upon the value chosen for the residual supply elasticity. These estimates are profit (not just revenue) losses since the costs of the increased promotion are already accounted for in the model.

Conclusion

The results of the analysis indicate that almond promotion has been a highly effective tool in stimulating almond demand and increasing producer profits. A best guess is that marginal dollars expended promoting almonds have yielded a return to producers in the range of 3:1 to 7:1. Of course, these rates of return are very favorable when compared to returns available to other investments. Given the specifications used in this study, the *average* return on investments in almond promotion is necessarily higher than the marginal returns.

Suppose, for example, that a 10 percent rate of return on investment is normal. Then any producer benefit-cost ratio in excess of 1.1:1 indicates a profitable expenditure of funds at the margin. In fact, to maximize its return from investments in almond promotion, the industry should expand promotion efforts to the point where the marginal expenditure on promotion just yields a return comparable to that available on investments elsewhere. The evidence suggests quite strongly, therefore, that the industry has spent too little on promotion over the time period analyzed here. Thus it was unfortunate from the industry's perspective that expenditures were curtailed from 1994/95 through 1996/97 due to litigation. We estimate that suspension of the advertising program cost the industry accumulated profits in the range of 90 to 234 million dollars during the period of the suspension.

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Table 1. Actual and Counterfactual Prices and Grower Profits for 1994/95 to 1996/97

Crop Years	Actual Prices ($/lb.)	Counterfactual Prices ($/lb.)	Actual Profits ($ millions)	Counterfactual Profits ($ millions)	Profit Reduction ($millions)
		U.S. Residual Elasticity = 0.86			
1994/95	1.47	1.61	1,075.01	1,166.54	91.53
1995/96	2.65	2.76	966.81	1,003.35	36.54
1996/97	2.14	2.37	1,083.41	1,189.55	106.14
		Total	3,125.23	3,359.44	234.21
		U.S. Residual Elasticity = 1.50			
1994/95	1.47	1.56	1,075.01	1,130.04	55.04
1995/96	2.65	2.73	966.81	992.16	25.35
1996/97	2.14	2.30	1,083.41	1,153.25	69.85
		Total	3,125.23	3,275.45	150.24
		U.S. Residual Elasticity = 2.56			
1994/95	1.47	1.53	1,075.01	1,105.72	30.71
1995/96	2.65	2.71	966.81	983.01	16.20
1996/97	2.14	2.24	1,083.41	1,126.12	42.71
		Total	3,125.23	3,214.85	89.62

The California Prune Board's Promotion Program: An Evaluation

Giannini Foundation Research Report No. 344, March 1998

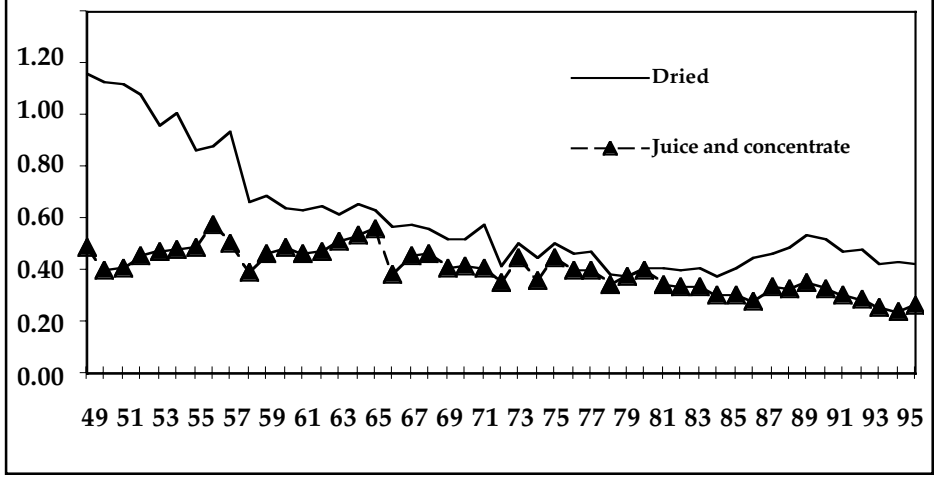
by J.M. Alston, H.F. Carman, J.A. Chalfant, J.M. Crespi, R.J. Sexton and R.S. Venner

The California prune industry, through the California Prune Board (CPB) and Sunsweet Growers, the largest marketer of California prunes, has invested substantially in the promotion of prunes to consumers. This study analyzes the effectiveness of these expenditures. The study focused on applying the economics of demand analysis to the California prune industry. Three data sets were used to estimate prune demand. These included monthly observations for the period from September 1992 to July 1996, annual observations on domestic prune shipments and prices for the period 1949 to 1995, and results of a test market analysis of television advertising for prunes conducted in six U.S. cities.

Results from analysis of the monthly data indicate that prune promotion has increased the demand for prunes. Across several alternative model specifications examined, the expenditure on prune promotion had a consistently statistically significant, positive impact on retail prune sales. For the various models estimated using ordinary least squares (OLS), the elasticity of sales with respect to promotion generally ranged from 0.17 to 0.22, meaning that a 10 percent increase in expenditures on promotion would have induced about a 2 percent increase in sales, holding price and other explanatory variables constant. The models based on the annual data series did not perform as well and were not used further in the analysis. Diagnostic tests led to the conclusion that, because of data deficiencies or an incorrect model form, the annual models were not specified correctly. Analysis of the test-market data indicates that the television advertisements had a positive and statistically significant effect on prune demand both during the period of the advertising campaign and during a post-test period. Print advertisements and in-store displays used during this time in conjunction with the television advertising campaign did not appear to have any independent impact on prune sales.

A simulation approach was used to translate the effects of promotion on prune demand into estimates of the resulting marginal benefits to prune growers. The marginal benefit-cost ratio for promotion of California prunes was calculated using the results of the monthly analysis of demand and alternative supply specifications in a simulation model for the industry. Promotion of California prunes by the CPB and Sunsweet Growers has significantly increased the demand for prunes and returns to prune producers. Over the four-year period analyzed, investments by prune growers in promotion yielded them marginal returns of at least $2.65 for every dollar spent. Moreover, marginal benefit-cost ratios in the range of 2.7:1, and higher, indicate that the industry could have profitably invested even more in promotion during this period.

Figure 1. U.S. Per-capita Consumption of California Prunes, 1949 - 1995 (in pounds)



An Economic Evaluation of California Avocado Industry Marketing Programs, 1961-1995

Giannini Foundation Research Report No. 345, July 1998

by Hoy F. Carman and R. Kim Craft

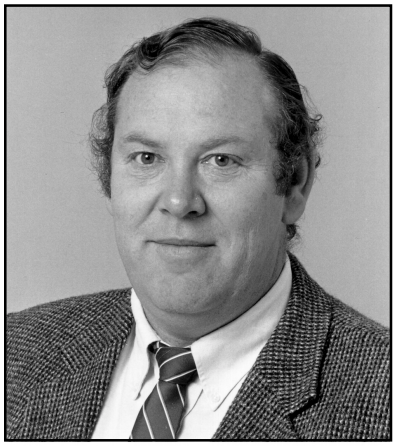
This study determines the effect of California avocado industry advertising and promotion expenditures on the demand and price for California avocados and estimates the ratio of benefits to costs for marketing programs conducted by the California Avocado Commission. Separate models for annual and monthly avocado demand were specified and estimated. Monthly results were in line with expectations and were a definite improvement over the annual model. Estimated coefficients for each of the variables had the expected sign, most were statistically significant, and the magnitude of the estimates was reasonable. Advertising and promotion expenditures had a statistically significant positive effect on the price of (and demand for) California avocados. The monthly and annual price flexibilities of demand with respect to advertising and promotion were almost identical (0.137 for the monthly analysis vs. 0.130 for the annual analysis). Advertising and promotion also had estimated lagged impacts on California avocado prices and demand that extended five months after the month the expenditures were paid. The estimated price flexibility of demand of -1.54 is larger than the annual estimate of -1.33, but the monthly quantity variable includes both California and Florida sales. The demand for California avocados at average prices and quantities is inelastic at both the farm and f.o.b. levels, whether measured on an annual or monthly basis. This means that total industry revenues will be less for a large crop than for a small crop.

Benefits accruing to the California avocado industry from advertising and promotion were measured in the short run (assuming fixed supply) and in the long run (after adjustment of acreage to price changes). The fixed supply (short-run) benefits were estimated both annually and monthly. The annual fixed supply industry returns from CAC advertising and promotion expenditures ranged from a weighted average of $5.33 to $6.01 per dollar spent, depending on the time period examined and the discount rate used. (Note that all returns are total returns before the deduction of advertising expenditures.) A simple average of the annual fixed supply benefit-cost ratios is equal to 5.25. Short term returns for the most recent nine years (1986-87 through 1994-95 marketing years), based on the monthly analysis and discounted at 3 percent, yields a weighted average return of $6.35 per dollar spent on advertising and promotion. For the nine-year period of analysis, the monthly marginal and average benefit-cost ratios are equal to 8.92. The marginal benefit-cost ratios were greater than one for all but two months of the period, indicating that the CAC could have profitably increased advertising and promotion during all but two months of the nine-year period.

These returns are eroded over time, however, when the acreage response to higher returns is factored into the analysis. The annual simulation model was run with actual and zero advertising and promotion expenditures and the annual difference in total industry revenues was compared to advertising and promotion expenditures. CAC marketing program expenditures increased estimated net total industry revenues by $102.8 million over the period of analysis. When real costs and returns were discounted at 0 and 3 percent, the overall long-run discounted real returns from advertising and promotion were $1.78 and $1.71 per dollar spent, if producers paid the total costs of the program. After accounting for costs shifted to buyers, California avocado producers enjoyed an estimated annual average benefit-cost ratio of 2.84 for the 34-years of the analysis. The long-run weighted average benefit-cost ratios with costs and returns discounted at 0 and 3 percent, are 2.48 and 2.26, respectively.

ARE Faculty Profile

Julian Alston was raised on the family farm at Katunga (near Numurkah) close to the Murray River in the Northern part of Victoria, Australia. Numurkah can be found in the Goulburn Valley, which is one of the primary irrigated agriculture regions in Australia, emphasizing horticulture and dairying, but surrounded by the more-traditional dryland sheep and wheat farms. The Goulburn Valley has a similar climate and topography, and similar economic history, and its current economic problems and issues are also similar to those found in parts of the Sacramento Valley. Julian's family grew deciduous canning fruits and beef cattle, but later switched to dairying when the bulk of the farm labor force, Julian, his younger brother and two older sisters, left for the city to seek gainful and less arduous employment.



Julian M. Alston
Professor
Agricultural and Resource Economics

Keenly aware of the nature of manual labor and his suitability for it, Julian boldly sought higher education. He studied Agricultural Science at the University of Melbourne. When he had completed his bachelor's degree, Julian began working as an economic policy analyst in the Department of Agriculture, which provided leave and financial support so that he was able to earn his Master's degree in agricultural economics from La Trobe University (also in Melbourne) and, later, his Ph.D. in economics from North Carolina State University.

After he completed his Ph.D. Julian returned to Victoria and became the chief economist in the (renamed) Department of Agriculture and Rural Affairs, which employed more than 2,000 agricultural research and extension staff. As chief economist, he was responsible for the supervision and management of the other departmental economists and their work, as well as participating in public policy processes and the management of the department as a whole. Ultimately, Julian concluded that doing and teaching economics would be more satisfying than being an administrator and a bureaucrat. He thus took his position at UC Davis in 1988.

Alston's scholarly research interests grew out of his early government service. His work on agricultural commodity markets, demand analysis, and the economics of R&D, can all be traced to underlying policy questions. He continues to have a primary research interest in the economic analysis of farm commodity programs and other domestic and international policies affecting agriculture. In the area of consumer demand analysis, he has worked closely with other ARE faculty members on econometric models of demand response to advertising, and studies of economic impacts of mandated generic commodity promotion campaigns for California agricultural commodities.

Much of Alston's work on agricultural research and development (R&D) is concerned with research policy for agriculture. One project led to the book *Making Science Pay: The Economics of Agricultural R&D Policy*, with Philip Pardey. This year, Alston and Pardey (with Vincent Smith) published a book on agricultural R&D institutions and investments in rich countries called *Paying for Agricultural Productivity*, and they have commenced a corresponding volume for less-developed countries.

In addition to his research activities, Dr. Alston enjoys teaching both undergraduate and graduate-level classes. He has recently taught microeconomic theory at the undergraduate, M.S., and Ph.D. levels, as well as more applied courses. His current teaching assignments include Supply and Demand for Agricultural Products, and the popular Agricultural Policy. He also provides support for graduate students and supervises their dissertation research.

When Julian is not in the lecture hall or his office, he enjoys reading, playing his guitar, taking advantage of the superb fishing resources in Northern California, and spending time with family and friends, many of whom are still in Australia.

Julian Alston can be contacted by telephone at (530)752-3283, or by e-mail at julian@primal.ucdavis.edu. You can visit his Web page at www.agecon.ucdavis.edu/Faculty/Julian A./Alston.html.

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