



THE GIANNINI FOUNDATION AND THE ECONOMICS OF COLLECTIVE ACTION IN THE MARKETING OF CALIFORNIA FARM PRODUCTS

Richard J. Sexton and Julian M. Alston

Richard J. Sexton and Julian M. Alston are professors in the Department of Agricultural and Resource Economics, University of California, Davis.

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The scope of marketing as defined in this study includes work related to the markets for farm commodities, marketing institutions, and the individual and collective actions of farmers to enhance their returns through marketing activities, with and without the assistance of the government. Thus this subset of the work of the members of the Giannini Foundation includes studies of (1) supply and demand for agricultural products separately or combined in sector models; (2) the structure, conduct, and performance of the marketing chain, including issues related to marketing margins and imperfect competition; (3) the space, form, and time dimensions of markets for commodities, including aspects such as the economics of storage, transport, handling, plant location, and interregional and international trade; (4) market mechanism substitutes and complements such as forward contracts and futures markets, private and public market information services, and different forms of business organization such as cooperatives and vertical integration; and (5) various forms of government intervention in markets, ranging from laws that facilitate collective action through cooperatives and marketing orders and the like to direct government intervention in markets, including domestic and border policies that may be strictly redistributive (like farm program policies) or that may entail public goods (such as policies related to research and development (R&D), food safety, public health, or exotic pests and diseases). The members of the Giannini Foundation have made a host of contributions across this range of topics.

Rather than attempt to describe that entire body of work here, some details are provided on contributions related to a subset: studies of collective action programs in California agriculture. This is a relatively narrow subset that encompasses work on agricultural cooperatives and marketing orders, but it represents a significant share of work undertaken in the Foundation. Moreover, some studies of collective action programs also exemplify other types of work, such as sector models of supply and demand for California specialty crops, studies of demand response to price and promotion, and grading innovations, for example, such that the representation is somewhat broader.



STUDIES OF COLLECTIVE ACTION BY FARMERS

Collective action programs have attracted the interest of agricultural economists in the Giannini Foundation because they have been important in California agriculture and because they raise interesting economic questions related to (1) the nature of competition and the potential roles for policies to countervail market power of middlemen, (2) the management of supply to influence prices and price variability (using prorates, fruit drops, tree- and vine-pull programs, and product diversion through “reserves”), (3) the management of demand and demand enhancement through generic commodity promotion programs and other activities, and (4) the provision of other commodity collective goods such as grading and packaging standards, market information, and industry public relations.

California has long been at the forefront regarding collective action among farm producers, perhaps because, if executed properly, the designs of collective action could work rather effectively here. California’s climate enables the state to produce many fruits, vegetables, and nuts that cannot be grown extensively elsewhere in the country, making the state the largest and in many cases the dominant domestic supplier of sixty or more commodities. In some cases, the lion’s share of the production is in the hands of a few dozen or fewer producers. Thus, opportunities to obtain an agreement among producers comprising a large collective market share to undertake actions for their mutual betterment, while representing only a wistful fantasy for producers of staple grains and livestock commodities, have represented a tantalizing possibility for California producers and their advocates and advisors.

PRODUCER COOPERATIVES

The first examples of collective action in California agriculture did not involve commodity marketing but, rather, dealt with irrigation. Parker (1940) identified the Matthew Ditch Company in Tulare County as the first of the cooperative irrigation projects and indicated that 615 mutual irrigation projects were under way in 1938. Due at least in part to the success of mutual irrigation companies in California, the state became a surplus producer of agricultural products, at which time marketing them to population centers on the East Coast, then accessible through completion of the Transcontinental Railroad, became an important consideration. The first marketing cooperatives in California were apparently two cheese factories organized in Santa Clara in 1876 and 1877 (Moulton 1973). The first fruit-marketing cooperative, the California Fruit Union, was organized in 1885 and failed shortly thereafter. The seeds of cooperation were sown during this same time among Southern California citrus growers with formation of the Orange Growers’ Protective Association and eventually the California Fruit Growers’ Exchange (now Sunkist Growers) emerged. Parker (1940) noted that by the 1937/38 marketing season there were 489 active cooperative marketing associations in California with fruits and vegetables (371), dairy products (33), nuts (30), grains (25), poultry and eggs (9), and livestock (7) representing the major commodities.

The most forceful and prolific proponent of collective action in California during this era was the lawyer Aaron Sapiro, whose ideas came to prominence in California in the 1920s and soon were exported elsewhere. Sapiro was an organizer and a



dynamic speaker, and his ideas on formation of strong marketing cooperatives were insightful and visionary. Through what became known as the “California model” (Sapiro 1923), Sapiro advocated organization along commodity lines rather than on locality. He stressed that cooperatives needed to be economic entities, not political ones; that long-term membership contracts with liquidated damage provisions were necessary to build success; and that a large market share was also required. In fact, Sapiro proposed that the membership contracts not become effective unless and until the market-share threshold (usually 50% or 75%) was attained. Sapiro also had a sophisticated vision of pooling concepts, including the need for multiple pools to reflect differences in quality of products delivered.

Sapiro focused his energies on producer-owned cooperatives rather than other forms of collective action. Most likely this emphasis was due to the passage of the Capper-Volstead Act in 1922, which made legal precisely the types of producer cartels that Sapiro was advocating. Although Sapiro lived until 1959, well past the statutory dates for authorization of federal and state marketing orders, his influence had ebbed by this point and little is known about his views regarding the role marketing orders might play in furthering producer collective action.¹

The main UC agricultural economist writing on cooperatives during this period was H.E. Erdman. Although Erdman was well aware of Sapiro’s work (Erdman 1950; Larson and Erdman 1962), he chose to focus on practical issues facing marketing cooperatives, such as pooling and financing—especially the development and use of revolving funds. In many ways his work represented a practical counterbalance to the overly optimistic vision promulgated by Sapiro. For example, Erdman and Wellman (1927) provided a cogent discussion of the issues associated with pooling in fruit cooperatives. The positive (risk sharing, efficiency in marketing) and negative (delayed payment, accounting properly for quality differentials) aspects of pooling identified by Erdman and Wellman apply equally well today.

Erdman (1935, 1941) also noted farmers’ fascination (no doubt inspired by Sapiro’s exhortations) with the idea of achieving a monopoly position in marketing and lucidly outlined the key difficulties: (1) the need to restrict supplies through carry-overs that depress the next year’s prices, (2) possible diseconomies of size from large-scale operations, and (3) opportunities for noncooperators to free-ride on cooperators’ efforts to support the market. This work evinces clear familiarity with Sapiro’s model of cooperation but seems to be an attempt to paint a more realistic view than Sapiro of what might reasonably be accomplished through cooperation. Erdman took issue with Sapiro’s claim that substantial market shares were crucial to achieving success, arguing that cooperatives “may be successful with 25 to 50 percent control” (1935, p. 2). Erdman (1942) represented a realistic assessment of what cooperatives likely can and cannot accomplish. In particular, he expressed deep skepticism about a range of market-control activities, including stabilizing production, controlling flow to market, fixing prices, and “eliminating the middleman.”

Late in his career, Erdman collaborated with Grace Larson to write a biography of Sapiro (Larson and Erdman 1962). The work was titled “Aaron Sapiro: Genius of Farm Cooperative Promotion,” but on balance the essay was quite critical of Sapiro, calling him a “promoter” and noting that many of the cooperatives he organized along



the “California model” resulted ultimately in failure. Not surprisingly, given Erdman’s career focus on the pragmatic aspects of achieving cooperative success, Larson and Erdman were most critical of Sapiro’s lack of attention to these details.

Various members of the Foundation devoted parts of their research programs to cooperation in Erdman’s footsteps. They include J.M. Tinley, who was also a tireless advocate for advanced university training on matters of cooperation; George Mehren; D. Barton DeLoach; and Norman Collins. In general, these writers focused on broad issues pertaining to cooperatives’ role in the agricultural economy and factors important to their success. DeLoach (1961, 1962), for example, believed that many cooperatives were too small to utilize the most efficient technological methods and recommended that they pursue collective bargaining instead of integrating into processing activities. Varden Fuller (1962) contrasted bargaining in agriculture with labor bargaining through unions. He viewed agricultural bargaining as inherently limited by its lack of the legislative protections relative to labor bargaining, but he believed that bargaining cooperatives could have influence in the nonprice dimensions of marketing, such as product quality, ethical practices, and communication and information.

DeLoach and Fuller were not alone in the Foundation in terms of their interest in cooperative bargaining. Indeed, given the prevalence of bargaining cooperatives on the West Coast and their relative paucity elsewhere, most of the economic analysis of cooperative bargaining came from Foundation members.² The defining treatise on cooperative bargaining in agriculture was the work of Sidney Hoos and his former student, Peter Helmberger (Helmberger and Hoos 1965), wherein the authors developed a theoretical framework to study bargaining based on a model of bilateral monopoly and tested empirically the ability of bargaining associations to affect raw product prices.³

Hoos maintained his interest in bargaining in subsequent years, writing frequently on the topic. He believed that bargaining in the right situations, “where there are pockets of buying monopoly resulting in excess profits to buyers” (Hoos 1970, p. 79) and undertaken cognizant of economic factors in the industry (“excessive use of bargaining power for too high prices will inevitably lead to a supply response from home or abroad, from old and new areas, and from imports and substitutes” (1969, p. 79)) could improve farmers’ lots if only they could agree to cooperate: “the discipline, the leadership, and the strategy of sticking together and following the leadership is yet to be learned in American agriculture” (1969, p. 79).⁴

The Foundation members’ emphasis on practical issues of cooperation kept them on the sidelines for the early years of a protracted theoretical debate about cooperatives. This debate, summarized by Sexton (1984), focused on the nature of the cooperative association and on equilibrium behavior for cooperatives in terms of prices set and volume of output produced. Was a cooperative a unique decision-making firm or a vertical extension of members’ farm enterprises, or a horizontal cartel or coalition? This debate raged for about twenty years, beginning with publication of the book *Economic Theory of Cooperation* in 1942 by Ivan Emelianoff. Foundation member Stephen Sosnick briefly entered the fray in 1960, opining quite correctly that each



of the competing visions of the economic nature of the cooperative was correct and useful.⁵

The defining work in this debate did, however, emerge from the Foundation in the form of a seminal article in the *Journal of Farm Economics* by Helmberger and Hoos (1962). This article remained the standard work on cooperative theory for at least two decades. The key contribution of Helmberger and Hoos and a follow-up paper by Helmberger (1964) was to establish both short- and long-run equilibrium models of the cooperative and provide a clear statement of distinguishing characteristics between the short and long run. The rigorous modeling was girded by assumptions that reflected the reality of how most cooperatives operated then and now. For example, the cooperative was assumed to operate at cost, accept members' entire production, and treat members uniformly.⁶

Helmberger and Hoos' paper was a high-water mark for the Foundation in terms of scholarly contributions to cooperation. Perhaps because it was regarded as such a definitive treatment of the problem, little conceptual work on cooperation was accomplished within the Foundation or elsewhere in the succeeding years. Various members of the Foundation did, however, continue to write and speak on cooperatives, focusing, in the tradition of Erdman, on issues important to the practical success of California's substantial cooperative sector. Key contributors during this period included Leon Garoyan, Kirby Moulton, Jerry Siebert, Stephen Sosnick, Eric Thor, and James Youde. Some examples include:

- Leon Garoyan's work on cooperative boards of directors. Garoyan regarded boards of directors as an "Achilles' heel" of cooperatives (Garoyan 1975), a condition to be ameliorated through training and improved flow of information to the directors, which Garoyan worked to provide through his extension program and as first director of the UC Center for Cooperatives.
- Sosnick's work on optimal pools for cooperatives. Sosnick (1963) provided a sophisticated analysis of the trade-off between efficiency (cost saving) aspects of a pooling method and the "aggregate inequity" associated with that method, which Sosnick defined as the sum of underpayments for members whose valuations were lower under the method compared to a complex (but costlier) alternative means of distributing revenues. Sosnick proposed a ten-step process to determine an optimal set of pools and applied the approach to avocados and the marketing cooperative Calavo.

Conceptual focus on cooperatives within the Foundation began anew in the 1980s with work by Sexton, who adopted an industrial organization and game theory focus in modeling cooperatives. Sexton (1986b) used the framework of vertical integration to study the economic role to be played by cooperatives in market-oriented economies. Sexton (1986a) exploited developments in cooperative game theory and the economic theory of clubs to formulate a model of a purchasing cooperative as a coalition, using the core as an equilibrium solution concept. In contrast to the Helmberger-Hoos model, which satisfied the cooperatives' zero-profit constraint through average-cost pricing, a second-best or Ramsey optimum, Sexton argued that cooperatives could adopt flexible financing to attain the first-best, marginal-cost-pricing optimum. In subsequent work, Sexton investigated the possible pro-competitive role



that cooperatives could play in a market economy as a potential entrant intended to integrate forward around a monopoly input supplier (Sexton and Sexton 1987) or as a “yardstick of competition” that induced more competitive behavior from investor-owned firms competing in the same market (Sexton 1990).

MANDATORY MARKETING PROGRAMS—THE EARLY YEARS

The Agricultural Adjustment Act (AAA), passed in 1933 as a response to the nation’s struggle to emerge from the ravages of the Depression, offered agricultural industries the opportunity to undertake collective action at the industrywide level if they could agree to do so. Californians were quick to embrace the collective marketing opportunities promised in the AAA. As early as 1933, C.C. Teague, president of the California Fruit Growers’ Exchange, reported that “practically all California farm products are right now considering ways and means to come under the provisions of this act” (Teague 1933, p. 7) and further expressed the hope that the AAA would provide the means to “end that promiscuous overshipment which went so far to demoralize the market this past winter” (p. 7). Although parts of the AAA were subsequently ruled unconstitutional, successor legislation was passed in 1937 in the form of the Agricultural Marketing Agreement Act (AMAA), which did pass constitutional muster. Schneider and Alcorn (1940) listed marketing programs for the following California commodities that operated under the auspices of the AAA or AMAA during the 1933–1939 period: walnuts, citrus, milk in San Diego, figs, prunes, hops, dates, and various tree fruits.

Meanwhile, California was considering its own legislation to regulate the marketing of farm products. Several acts emerged in the 1930s alone, including the Agricultural Prorate Act (1933), California Agricultural Adjustment Act (1935), California Agricultural Products Marketing Act (1935), California Marketing Agreement Act (1935), and California Marketing Act (1937). The impetus to create mandatory programs in California was attributed to the failure of cooperatives to obtain the outcomes promised by Sapiro due to defections by members in high-price years and free-riding by those outside the cooperative (Mehren 1949) and by the subsequent failure of voluntary market-control programs. Outsiders inevitably would gain “disproportionately and withdraw on one pretext or another” (Mehren 1949, p. 8).⁷ Erdman (1938) pointed in particular to the failure of a “gentlemen’s agreement” to limit the peach pack to thirteen million cases in 1928 as a forceful impetus to implement mandatory programs.

Schneider and Alcorn listed the following commodities as operating under the auspices of a California marketing program during 1933–1939: olives, pears, prunes, tomatoes, sweet potatoes, raisins, figs, asparagus, lettuce, grapes, potatoes, milk (under various regional control boards), canning peaches, oranges and grapefruits, walnuts, dates, pears, and wine. In total, Schneider and Alcorn listed forty-one industry marketing programs covering twenty-one commodities operating in California as of December 1939. Less than two years later, September 1941, Schneider (1942) reported seventy-four industry marketing programs in effect in California (thirty-seven involving milk), of which fifty-five were active.



Clearly, Californians were quick to embrace the notion of collective marketing. Although the specific activities undertaken through collective action have changed over time, mandatory marketing programs have remained important in California agriculture to this day, as Carman and Alston's (2005) recent review of the history and contemporary status of California's mandated commodity programs demonstrates. They reported that California had sixty-two active marketing programs including twelve federal marketing orders, twenty-seven state marketing orders and agreements, twenty commissions, and three councils. These sixty-two marketing programs covered almost 55% of the value of California's 2002 agricultural production, including more than 78% of animal products, 73% of fruit and nut crops, and 43% of vegetable crops. In 2003/04 California commodity program budgets had total budgeted expenditures of more than \$208 million, about 1.2% of the \$16.8 billion total value of the crops covered (Carman and Alston 2005). While expenditures as a percentage of total value are relatively small, they have increased significantly over time and have become increasingly controversial.

Analysis of these marketing programs from members of the Foundation began almost with their inception. Stokdyk (1933a) provided a comprehensive economic and legal analysis of compulsory volume control that included addressing the philosophical issue of whether such mandatory programs represented an "unwarranted restriction on individuals' rights." In Stokdyk's view, they did not because mandatory programs spread "the benefits and burdens on every grower in the particular industry." Of course, the issue is a topic of debate to this day.

Stokdyk (1933b) and Erdman (1934) provided descriptions and assessments of California's 1933 Agricultural Prorate Act. The act provided for supply management when supported by two-thirds of the growers controlling two-thirds of the acreage and approved by a nine-member prorate commission. Erdman viewed the act as a positive marketing tool for specialty crops "produced in concentrated areas and shipped to distant markets" (Erdman 1934, p. 631). He believed that these markets could become "badly demoralized" by the vicissitudes in supply and demand and unevenness in shipments. In his view, such situations could be handled under the act with the burden shared equally by all members of the group.

Wellman (1935) discussed the failure of voluntary supply-control programs: "usually, however, the increased returns accruing to the man on the 'outside' were even larger, since he obtained most of the benefits of the program without bearing any of the costs," which led to the consideration of mandatory programs. Early marketing programs focused on direct supply control and Wellman recognized that the financial trade-off to producers between marketing a large crop at a low price and a smaller crop at a higher price hinged on the elasticity of demand for the product and the costs of marketing.⁸ Wellman suggested that "with the exception of raisins, the present available evidence indicates that the consumer demand schedule for all of California fruits and vegetables under marketing agreements tends to be elastic."⁹ Still, Wellman argued that supply control might raise returns to producers in the short run because of marketing costs saved by selling a shorter crop. He cautioned, however, that implementation of supply control over the long run could cause consumers to "turn away from that product" or "abandon it entirely." He recognized further that programs that stimulated returns above those obtainable from other crops would cause plantings to



increase. Noting the delayed supply response inherent in perennial crops, Wellman raised the possibility of an apocalyptic outcome whereby reduced consumer demand met increased producer supply.¹⁰ On balance, however, he concluded that the early marketing agreements had been worthwhile.

Overall, the writings of Foundation economists during the early years of mandatory marketing programs reveal an acute knowledge of the economic and philosophical issues surrounding these programs—issues that remain with us to this day. The writings of the authors who addressed these programs in their early years, particularly Erdman, Wellman, and Stokdyk, and those of the next generation, including Hoos and Mehren,¹¹ also reveal a considerable consensus of opinion regarding these programs. They regarded the programs on balance as favorable to producers but cautioned against undue reliance on such programs, arguing that volume control should be used as a tool in exceptional circumstances, such as to handle temporary or seasonal surpluses. They took the view that volume controls should not be used to unduly enhance prices lest consumers become disenchanted and undesirable supply response be stimulated and that volume controls implemented along these lines would not harm consumers or unduly infringe upon individuals' rights.¹²

MORE RECENT WORK ON VOLUME CONTROL THROUGH MARKETING ORDERS

Supply management provisions authorize commodity groups to legally regulate the supply of agricultural products marketed, ostensibly at least as a tool for orderly marketing. Because supply management was the primary focus of the first state and federal marketing programs in California, it was emphasized in the work of the Foundation's agricultural economists during these years, as the preceding discussion indicates. As the functions performed by mandatory marketing programs evolved and expanded over time, so, too, did the analyses performed within the Foundation. For example, Sidney Hoos' lecture on marketing programs at Rutgers on April 26, 1962 included about six pages of discussion on supply management and two pages each on research and promotion (Hoos 1962).

Even as other provisions assumed importance in marketing orders and attracted the attention of agricultural economists in the Foundation, research on the supply-management provisions of marketing orders continued apace. A key innovation in analysis of the effects of market-control programs was simulation of their effects through econometric models of the industry structure. The work by Ben French and Ray Bressler (1962) on the lemon cycle represents a breakthrough contribution in this regard. The authors tackled the difficult issue of estimating supply response for a perennial crop by formulating an equation for the planting of trees as a function of past profitability and an equation for removals expressed as a function of expected current profits, age of trees, and urban expansion. An inverse demand function was estimated as a function of per capita sales, per capita disposable incomes, time, and time squared.¹³ The lemon order allowed the industry to regulate the flow of lemons to fresh and processed market outlets, and French and Bressler evaluated three alternative market-control scenarios: a status quo scenario, a scenario in which more stringent restrictions are imposed on sales to the fresh market, and a scenario in which the marketing order is abolished. Under the order-abolition scenario the



authors forecasted sharp decreases in on-tree prices with a four- to five-year adjustment period to supply required to return prices to profitable levels.¹⁴

The specification and estimation of structural econometric models of California farm industries for the purposes of conducting simulations, comparative statics, and policy analysis became a staple mode of analysis for Foundation members in the years following French and Bressler and continues to this day. Ben French and his long-time colleague and collaborator, Gordon King, were the foremost practitioners of the art and many graduate students became experts and innovators in the methodology under their tutelage.

French and Matthews (1971) advanced the formulation of perennial supply response modeling by utilizing Nerlove's adaptive expectation framework to model desired producer supply and desired bearing acreage. New plantings were then based on differences between actual and desired bearing acreage. Whereas Bressler and French had utilized actual and simple trend yields in their projections, French and Matthews specified an econometric yield function with age structure of the bearing acreage and time trend as explanatory variables.¹⁵ French's student at the time, Gordon Rausser (1971), also made innovations in perennial supply response modeling by utilizing an investment-behavior approach in his dissertation on the California-Arizona orange industry, an approach that was adopted and extended years later in work by Foundation member Dale Heien and Davis graduate student Jeffrey Dorfman (Dorfman and Heien 1989) on California almonds.

The California cling peach industry provided an excellent laboratory for the analysis of market control programs. This industry had provisions authorizing green drops, tree pulls, removal of surplus fruit from trees in lieu of green drops, diversion of seasonal surpluses into noncommercial uses, and establishment of stabilization funds. It was not surprising, thus, that this industry came under the scrutiny of French and King and their student, Dwight Minami (Minami, French, and King 1979). This work evinces the increasing sophistication of the structural econometric modeling introduced by French and Bressler (1962). Supply response was specified much as in French and Matthews (1971) but the demand subsystem was complex. It included equations to represent processors' allocation of the raw product across regular pack peaches, fruit cocktail, and other uses; FOB (processor) price equations for regular pack and fruit cocktail (essentially, inverse demand equations); and, finally, equations for the marketing margin from which farm prices were derived from the FOB prices. This model included a direct attempt to explain the marketing board's behavior by specifying the quantity marketed as a function of lagged prices, lagged marketed quantities, carry-over stocks, and other exogenous factors.

Simulated market performance in the absence of supply-control programs within this framework was accomplished simply by setting all supply-control variables to zero.¹⁶ On balance, the authors concluded that the marketing order program for cling peaches had succeeded in raising net returns to growers and reducing their variability but the program had also reduced consumer surplus by an amount that was greater than producers had benefited. The authors called the program "an expensive means of providing improved returns and greater stability to the cling peach industry" (French and Matthews 1971, p. 93). They also criticized the industry for making



programs such as green drop and cannery diversions a permanent feature of the industry landscape when they had been intended as temporary fixes.

The baton as the leading California authority on marketing orders had now passed from Sidney Hoos to Ben French and the commissioning of a USDA review of federal marketing orders for fruits, vegetables, and specialty crops (USDA 1981) came under French's review and critique at the 1982 Agricultural and Applied Economics Association meetings (French 1982). The American Agricultural Economics Association provided his overall assessment of marketing order performance in the area of supply management and the state of agricultural economics research on marketing orders. French was critical of the review team's favorable assessment of the stabilization functions of marketing orders, arguing that they failed to consider land as a limiting input. Thus, the additional supply of program commodities caused by a stabilized marketing environment probably was offset at least somewhat by reduced supplies of nonprogram commodities. On balance, however, French supported the review team's recommendations (implemented in large part by USDA) to rein in marketing order excesses by limiting the direct use of volume controls and discouraging year-to-year changes in quality standards as an indirect form of volume control.

The review also provides insight into French's reservations about his structural econometric approach to evaluating marketing order programs. Three of his four concerns relate to limitations of almost any econometric exercise—sensitivity of results to modeling choices such as functional form, data limitations, and partial equilibrium (single commodity) analysis instead of a more encompassing multi-commodity approach. The fourth revisits his concern, stated originally in French and Bressler (1962), about whether it is possible to simulate a market control program's absence with a model parameterized from data generated during its presence.

Although supply management programs waned in usage through the 1970s and 1980s, those that remained in use were controversial and continued to attract the attention of Foundation economists. Ben French and Carole Nuckton (1991) collaborated, extending econometric modeling by Nuckton, French, and King (1988), to evaluate the impacts of the raisin marketing order and the performance of the raisin administrative committee (RAC). Their model resembles rather closely the updated work on cling peaches by French and King (1988) with equations to represent the behavior of the RAC that are reminiscent of Minami, French, and King's (1979) model for cling peaches. French and Nuckton gave a favorable assessment of the RAC's activities, arguing that the beneficial aspects of reduced variability of prices and grower returns due to market control caused higher production and possibly lower prices to consumers: "the public interest may have been well served by the raisin volume control program, or at worst, there was no significant welfare loss" (French and Nuckton 1991, p. 593).

Alston et al. (1995) addressed market control issues for the California almond industry but from a different philosophical perspective than French and Nuckton. Whereas French and colleagues were generally concerned with overall welfare and policy issues pertaining to market control and, specifically, with asking what an industry might look like if its program were abolished, Alston et al. took the almond order's existence as given and asked what type of market control policies would



maximize welfare to the industry. Essentially, these authors accepted the cartel power granted to industries through marketing order legislation as a tool they were free to wield and asked how the tool might be used most effectively. Optimal reserve strategy was simulated over a fifty-year horizon and industry profits from the optimal strategy were compared to a no-reserve strategy and a strategy of static (year by year) profit maximization. The optimal strategy involved allocating increased sales to export markets in the early years of the horizon (relative to the static strategy) to target markets of California's key international competitor, Spain.

While French and King, their students, and Alston et al. focused on the annual supply management policies for perennial crops such as almonds, cling peaches, and raisins, another group of Foundation authors was investigating flow-to-market controls for California-Arizona citrus. Both oranges and lemons are capable of on-tree storage, creating the opportunity to allocate the harvest to the fresh market over a period of months, and they also feature fresh-market demands that are considerably more inelastic than demands for the fruit in processed uses. Thus, opportunities for optimization of market flows over time and across fresh versus processed outlets presented themselves.¹⁷

Rausser's dissertation (1971) provided the first rigorous econometric modeling of the California-Arizona orange industry and Peter Thor (1980), in his dissertation, extended that work to focus specifically on the marketing order. Thor then collaborated with Edward Jesse (1981) to undertake an econometric investigation of the impacts of abolishing the federal marketing order for California-Arizona oranges. The most well-known and definitive analysis of this marketing order, however, is by Lawrence Shepard (1986). Shepard's econometric modeling and simulations followed closely in the French and King tradition but his analysis was couched squarely in the framework that marketing orders with volume control provisions fundamentally represent cartels, the position also adopted years later by Alston et al. (1995). Shepard documented the third-degree price discrimination scheme employed by the industry, also demonstrating that increased supply caused by the cartel's success and inability to prevent entry caused, over time, an increasing percentage of crop to be diverted to the processing market to maintain prices in the fresh market. Shepard was critical of the order's effects: "the conspicuous long-run effect of federal regulation has been a legacy of pronounced disequilibrium in the processing sector and misallocation of resources towards orange production" (Shepard 1986, p. 121).¹⁸

Updated analysis that followed the seminal French and Bressler (1962) study was being performed on the weekly market allocation scheme employed by the California-Arizona lemon industry at around this same time within the Foundation by Kinney et al. (1987) and Carman and Pick (1988, 1990). This work yielded familiar conclusions as to the short-run adverse implications to consumers and overall welfare of diversions from fresh to processed markets, but these authors raised the trade-off also noted by French and Nuckton (1991): that increased supply caused by higher returns might cause the program to benefit lemon consumers over the long run.¹⁹



GRADES, STANDARDS, AND QUALITY ASSURANCE

Uniform grade standards and packaging regulations can play important roles in markets for products being sold by description and transported to distant markets in the eastern United States and internationally. Hence, they became a feature of California agriculture. Some standards and regulations were introduced and implemented by the USDA and the State of California and some were the result of action by marketing orders. In many instances such interventions facilitate more efficient markets and are primarily pro-competitive but packaging regulations and minimum standards can also be anti-competitive if they divert edible product to noncommercial uses or create barriers to entry. This trade-off in the use of minimum quality standards was recognized in the early work by Giannini Foundation members (e.g., Wellman (1935) and Hoos (1962)). Such policies were not subject to much in the way of formal analysis until relatively recently however.²⁰

A number of dimensions of economic implications of grading regulations have been subjected to analysis and measurement in recent years, reflecting both evolution in the application of the policies and evolution in the focus of economists. One example is the one-variety law for California cotton, introduced in 1925 to regulate the varieties of cotton that could be grown in the San Joaquin Valley, which was the subject of John Constantine's (1993) UC Davis dissertation. At the time it was introduced, the one-variety law was supposed to enhance demand for California cotton by assuring production of a uniform and high-quality staple, and perhaps it did. However, over time the law became increasingly expensive as a brake on yield improvement, particularly for some parts of the valley, and increasingly unnecessary for quality assurance, though it continued to benefit one group of California growers, albeit at the expense of other California growers and the nation. These issues were exposed by the work of economists of the Giannini Foundation (Constantine, Alston, and Smith 1994; Olmstead and Rhode 2003). The one-variety law was later eliminated.

Failure to grade commodities based on their quality and to differentiate payments accordingly or to distinguish quality differences in cooperative pools causes an adverse selection problem because low-quality products receive the same payment as high-quality products though the former are presumably cheaper to produce. Thus, the failure to adopt grading standards can cause high-quality production to exit the market entirely or to bypass the market via vertical integration (Hennessy 1996).

Most grading systems mitigate but do not eliminate the adverse selection problem because grading is conducted with error and the nature of the errors is usually to undervalue high-quality products and overvalue low-quality products. Foundation economists James Chalfant and Richard Sexton, working with Davis graduate students Jennifer James and Nathalie Lavoie (Chalfant et al. 1999), provided a quantitative assessment of the importance of these errors in the context of the California prune industry. Prunes are graded for size on a screen and small prunes may not fall through the designated screen, traveling on instead to screens intended for larger prunes. Thus, some "small" prunes are graded as "large," meaning that rational processors will reduce their payments for large prunes accordingly. The authors



estimated that the undervaluation of large prunes was on the order of 4–8% but the overvaluation of the smallest prunes could be as high as 73%.

Because these grading errors could be reduced markedly with easy-to-implement improvements in the grading mechanism, Chalfant and Sexton (2002) asked why such improvements were not undertaken and suggested that the answer could lie with a form of hidden supply control, a modern twist on the observation of the original Foundation economists that minimum quality standards may be used to achieve volume control. In this case the authors noted that large prunes were sold in retail packs for fresh consumption and had inelastic demand while small prunes were processed into paste and juice and had elastic demand. Thus, undervaluing large prunes relative to small prunes reduced incentives to produce them, thereby contributing to a classic third-degree price discrimination scheme.

Marketing orders provide quality assurance in other ways. The most recent marketing order introduced in California is an example. The federal marketing order for California pistachios was introduced in 2005, mandating a lower maximum tolerance for aflatoxin (a toxic compound produced by fungus) in California pistachios sold in the United States, combined with federal inspection. The stated purpose of the order is to enhance demand by reducing the odds of an aflatoxin event in the pistachio market and mitigating the consequences from an event when it occurs. Like other collective action programs, this particular “self-help” program may entail an element of “help yourself” in that it may have a hidden purpose of introducing a nontariff barrier against future competition from imports that may not easily meet the higher California quality standards. Gray et al. (2005) reported the results of an *ex ante* analysis of this new law in a Giannini Foundation monograph, finding significant net benefits to California and the industry.

GENERIC PROMOTION AND OTHER DEMAND ENHANCEMENT PROGRAMS

A significant share of the Giannini Foundation literature on the economics of generic commodity promotion can be seen as an element of the general literature on California specialty crops, as discussed in the previous section, although it extends beyond that. Of the current sixty-two mandated commodity programs in California, forty-two have active programs for commodity advertising or other forms of promotion. Of the \$208 million spent in 2003/04 by the programs, \$146 million was for advertising and promotion.

Programs authorized to undertake advertising and promotion activities were introduced initially in state marketing orders. In 1962, Hoos noted that advertising and promotion were not permitted by marketing orders under the federal enabling legislation but that “one should not be surprised if such a provision were added to the federal legislation in the future. This is the most frequently used provision under state marketing order legislation” (1962, p. 11). In subsequent years, California’s generic advertising and promotion programs expanded with the introduction of programs under federal marketing orders and stand-alone commissions for many commodities under California law.²¹

Members of the Giannini Foundation did not participate much in the literature on generic commodity promotion programs during the following twenty years or



so, which were dominated by studies of dairy promotion, reflecting the comparative importance of dairy promotion that continues to this day. This pattern changed in the 1990s with a resurgence of interest in California and throughout the United States in modeling and measuring the payoff to promotion. This resurgence reflected a serendipitous combination of (1) a growing interest of economists in methods for measuring the demand response to promotion and other demand shifters in the context of demand system models (e.g., Piggott et al. (1996)) and (2) a demand for evidence to be utilized both in the courts and in government as promotion programs came under increasing public scrutiny.

John Crespi (2000), as part of his UC Davis dissertation, documented the long history of legislation and litigation related to the issue of compulsory speech and the First Amendment more generally in the United States to provide a framework for his analysis of the legal history of generic commodity promotion programs. Crespi (2005) noted that “after decades of relative calm . . . the 1980s and 1990s saw a swell of litigation, with nearly every commodity promotion program in the country involved in lawsuits over their constitutionality” (2005, p. 39). Remarkably, several cases involving commodity promotion have been heard before the U.S. Supreme Court since 1989: beef (1989); tree fruits, including peaches, plums, and nectarines (1997); mushrooms (1999); and beef again (2003, 2005).

In response to the demand for analysis of these programs, economists both at the Giannini Foundation and elsewhere undertook many studies of demand response to advertising and promotion. These studies have been reported in a variety of books, monographs, and journal articles, including some in Giannini Foundation publications. In 2005, a book—*The Economics of Commodity Promotion Programs: Lessons from California*—was published synthesizing and summarizing the findings of the work on generic promotion of California commodities. The four economists who conceived and edited the book included two members of the Giannini Foundation, Julian Alston and Richard Sexton, and a former UC Davis student, John Crespi. The book comprises seventeen chapters, including chapters covering the relevant institutional and legal history and relevant general theory, eight case studies of specific California commodity programs (for table grapes, eggs, dried plums, avocados, almonds, walnuts, raisins, and strawberries), and four case studies of other types of demand enhancement activities by California marketing programs.²² Five of the case studies had been reported in full in a Giannini Foundation monograph or research report.

CONCLUSION

As noted in the previous paper by Alston and Sexton, in writing these two papers we set out to review and evaluate the work of the economists who have served as members of the Giannini Foundation in applied research and their achievements in agricultural marketing. We adopted an approach to this subject that combined (1) a broad overview of the entire (sub)field of agricultural marketing at the University of California over the seventy-five years of the Giannini Foundation (in the previous paper) with (2) a more detailed and more nearly comprehensive and representative look at the contributions by Foundation economists to work on the economics of collective action in California agriculture with particular emphasis on cooperatives and mandated marketing programs (in the present paper). Our purpose was not to be



comprehensive but to try to be representative. We hope we may have at least achieved that and, in the process, demonstrated the important roles played by members of the Giannini Foundation over seventy-five years in contributing to the evolution of this key field in the economics of agriculture.

NOTES

1. Sapiro's reputation probably waned because he tried to export the California model to commodity settings where it had very little hope of succeeding, such as U.S. and western Canadian wheat. Indeed, Sapiro's advocacy of collective action among wheat farmers led to an anti-Semitic attack launched against him by a newspaper, *The Dearborn Independent*, believed to be controlled by Henry Ford. Sapiro in turn filed a defamation lawsuit against Ford, an act which probably brought Sapiro as much lasting recognition as his advocacy for producer cooperatives (Larson and Erdman 1962).
2. The first cooperative bargaining associations in California appeared shortly after World War I for canning pears, followed shortly by organization of a bargaining association of cling peach growers (Hoos 1968).
3. This work and a shorter piece in the *Journal of Farm Economics* indicate these authors' familiarity with the nascent game-theory revolution in economics and with the work on bargaining conducted by the pioneers of game theory such as von Neuman, Nash, and Harsanyi. Helmerberger and Hoos (1963) represent a cogent and skeptical inquiry into the usefulness of this work to understanding cooperative bargaining in agriculture.
4. A historical footnote is that later in his career Hoos worked to refine the economic theory of cooperative bargaining, including specifying a price-bargaining function that purported to yield the bargained price as a function of buyers' and sellers' target prices and bargaining power; a variable A that measured the "economic, legal, and institutional environment in which bargaining occurs" (Hoos 1975, p. 3); and a variable T to measure the "influence of time on the bargaining process and its participants." This function, which Hoos believed could be specified as a Cobb-Douglas function, appears to have been conjured out of thin air, a criticism that he anticipated and addressed as follows: "In answer to the obvious question 'but where do we get the price bargaining function?,' the reply is 'at the same place where we get the various other types of functions used in economic analysis'" (Hoos 1975, p. 4).
5. Sexton (1984) demonstrated that authors writing from the different ideological perspectives arrived, in fact, at the same set of equilibrium solutions for cooperative behavior, although they did not recognize it at the time, meaning that Sosnick was correct to be critical of energies devoted to this debate.
6. A measure of the importance of Helmerberger and Hoos (1962) is that the article was reprinted twenty-three years later in the *Journal of Cooperatives*.
7. These voluntary programs were known as the "clearinghouse movement" because they expanded the cooperative movement to include shippers and packers (Erdman 1934).
8. Some early marketing programs also had provisions to prohibit the marketing of lower-quality produce through normal commercial channels. It is interesting that, at the very inception of these programs, Wellman advanced the argument that remains in effect today: quality controls operate mainly as a hidden form of volume control. "The chief way in which quality regulations . . . influence total returns to growers is through reductions in the total volume marketed."
9. This interesting conclusion is at odds with the common contemporary belief, supported by econometric evidence, that marketwide demands for fruits and vegetables and for milk are mostly price inelastic. However, many of these commodities were probably luxury goods for many consumers during the Depression era in which Wellman wrote, making it conceivable that demands were price elastic during that time even if they are inelastic today. Notably, however,



the pioneering statistical analyses of demand for California farm commodities provided evidence of inelastic demands. See, for example, French and Bressler (1962) and the references they cite. On the other hand, when we allow for the roles of international trade, storage, and the dynamics of competitor supply response, the relevant demand for policy purposes may be quite elastic over the relevant length of run even when the domestic demand is inelastic. Wellman was clearly aware of these complications in relation to the relevant concept of demand elasticity.

10. These points were revisited some sixty years later in a Giannini Foundation monograph by Alston et al. (1995) in a study of the effects of the California almond reserve policy, which temporarily raised prices by diverting supply to nonedible uses but had longer-term deleterious effects on demand and profits by encouraging the competitive fringe. Utilizing the computing resources available to them but that were probably unimaginable to Wellman, these authors simulated optimal reserve policy for the almond industry over a fifty-year horizon. This policy expressly took account of the impact that California volume controls would have on world prices and outside supply.
11. Sidney Hoos attained almost legendary status for his advice and technical assistance rendered in support of various California marketing programs while at the same time speaking and writing widely on the limitations of what these programs could hope to accomplish (e.g., Hoos (1960, 1962)). Agriculturalists in other states reached out to Hoos, no doubt in part based upon their belief, not unfounded, that California represented the cutting edge in concept and practice in collective marketing.
12. J.M. Tinley (1939), however, did not agree with this “consensus” Foundation view. He argued that prorates only delayed necessary adjustments in markets and would lead to more individuals and groups seeking to obtain monopoly control with ultimately disastrous consequences: “The widespread and continued use of prorates . . . cannot be anything else than anti-social” (1939, p. 124).
13. The authors dutifully worried about simultaneity in this relationship but concluded that since total supply of lemons was predetermined and allocation between fresh and processed markets was determined by the marketing order, bias from simultaneity would be unimportant.
14. Noteworthy in this initial development of an industry structural econometric model was the authors’ anticipation of a key criticism of the approach that was to gain some prominence in subsequent years—namely, the stability of the estimated coefficients to shocks in the industry structure: “unpredictable changes in technology, psychology, biology, and other factors may alter both the coefficients or form of the equations and the environment within which they must operate” (French and Bressler 1962, p. 1036). Of course, abolition of the marketing program would itself represent just such a structural shock. This type of critique became formalized years later in the macroeconomics literature as the “Lucas critique” (e.g., Lucas (1976)) and represented a source of ongoing concern for French and his colleagues as this methodology evolved.
15. French and Matthews cite Muth’s seminal 1961 *Econometrica* article on rational expectations and argue that the behavior in their model “appears similar to the type which Muth refers to as ‘rational expectations’” (French and Matthews 1971, p. 484) but in actuality, expected profits are specified as a function of lagged profits.
16. Notably, French and King (1988) undertook a subsequent econometric modeling project on the California cling peach industry. This effort differed considerably from their earlier work with Minami, reflecting changes in the industry and in the use of market control programs. Although the marketing order programs remained in effect, the industry had not utilized surplus elimination since 1972. The econometric model, which involved forty-five components (see French and King (1988), table 10), did not involve a specification for the marketing board’s behavior and simulations focused not on the marketing order but on much more traditional comparative statistics variables such as changes in production costs, trends in yields, trade policy, and population growth.



17. The California milk marketing order has used classified pricing (introduced under the 1935 Young Act) to implement price discrimination and pooling arrangements to distribute the additional revenue among suppliers and this has been a comparatively economically important policy. However, this policy had not been subject to the kinds of analysis that were applied to specialty crop counterparts until relatively recently in work by Daniel Sumner with several Davis graduate students (e.g., Sumner and Wolf (1996); Sumner and Wilson (2000)).
18. Notice that this negative interpretation of higher and stabilized supply due to a marketing program contrasts with the favorable view of French and Nuckton (1991).
19. Of course, the criticism of this argument noted by French himself (1982) is also valid, namely that the higher supply of the marketing order crop most likely comes at least in part from reduced supplies of other crops.
20. John Freebairn received his doctorate from the agricultural economics department at UC Davis in 1973 and in the same year published a paper in the *Australian Journal of Agricultural Economics* on “The Value of Information Provided by a Uniform Grading Scheme,” which is one of the few publications in this area until recently.
21. In their famous article, “Advertising without Supply Control,” which was applied to orange advertising by Sunkist Growers in California and by the Florida Citrus Commission, Nerlove and Waugh (1961), who were not Gianni Foundation economists, cited an article in the *Journal of Farm Economics* by Hoos (1959) that discussed issues in evaluating commodity advertising.
22. Coauthors of the various chapters included seven current members of the Foundation—Julian Alston, Hoy Carman, Colin Carter, James Chalfant, Rachael Goodhue, Richard Sexton, and Daniel Sumner—a reflection of the widespread contemporary interest in these programs within the Foundation.

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