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INTRODUCTION
A HISTORICAL NOTE ON THE ACTIVITIES OF THE FOUNDATION

The purpose of “The Giannini Foundation of Agricultural Economics” was set forth in a letter from the Bancitaly Corporation to the Regents of the University of California (UC) dated February 10, 1928.

“The activities of the FOUNDATION shall be embraced by the great field of Agricultural Economics, and relate to such subjects as:

a) The economic consequences of increased production which result from improved seed grains, improved nursery stock, improved livestock, improved machinery, and improved methods of farming;

b) The economic consequences of overproduction arising from unusually favored seasons or unusually unfavorable seasons as to weather and other conditions in producing nations;

c) The relations between conditions existing in the farming industry and the general economic conditions prevailing in the nation and internationally;

d) The acquiring of such knowledge concerning soil qualities and climatic and other conditions in any or all parts of the State of California, and of such knowledge concerning existing or prospective supply and demand conditions for the various agricultural products of the state, as will enable the appropriate representatives of the Foundation to advise the farmers of California as to wise plantings, sowings, breeding, etc., in relation to areas and kinds;

e) The methods and problems of disposing of farm products on terms or conditions giving maximum degree of satisfaction to producers;

f) Any economic questions which concern the individual farmer and the members of his family, and affect their living conditions, and so on.

However it should be understood that the activities of the Foundation are to be regarded as chiefly:

a) Those of research, with purpose to find the facts and conditions that will promise or threaten to affect the economic status of California agriculturalists; and

b) Those of formulating ways and means of enabling the agriculturalists of California to profit from the existence of favorable facts and conditions, and/or protect themselves as well as possible from adverse facts and conditions.
It seemed appropriate to ask how well the Foundation met its charges. There are three dominant themes in the six items:

**THEME I: “The Production Side of California Agriculture”**
Items (a) consequences of productivity growth; (b) consequences of shocks, plus and minus variability; and (d) advise on choices of products and volume of production.

**THEME II: “Profitable Marketing of California Production”**
Item (e) methods and problems in disposing of products profitably.

**THEME III: “California Farmers in a Global Context”**
Items (c) national and international impacts; (f) facts and conditions that impact agriculturalists and help them design policies and programs that manage external events—positive events such as good markets, policy, and marketing structure and negative events such as environmental constraints, pesticides, water and air quality, and waste disposal; resource competition for land and water.

Three papers were commissioned and presented at the symposium. The authors have revised those papers with the marketing paper divided into two parts. The revised papers follow in a slightly different order because the early pages of the first marketing paper by Julian Alston and Richard Sexton do a very nice job of setting the dynamic context for the Foundation in terms of changes in California agriculture, the professions of economics and agricultural economics; and the University of California. The remainder of the first paper focuses on market studies. The second paper by Sexton and Alston narrows the focus to collective action. The supply side of California agriculture is addressed in the third paper by Dan Sumner. The fourth paper by Gordon Rausser focuses on the welfare of California agriculturalists in the broader context of the state, the nation, and the world.

The section closes with a set of comments from four distinguished Giannini Foundation alumni who received their doctoral degrees from the University of California.

**EVALUATIONS – HOW WELL DID WE DO?**

- Giannini Foundation Contributions to Agricultural Marketing Studies
  *Julian M. Alston and Richard J. Sexton*

- The Giannini Foundation and the Economics of Collective Action in the Marketing of California Farm Products
  *Richard J. Sexton and Julian M. Alston*

- Economics and Agricultural Supply in California: The Activities and Role of the Giannini Foundation
  *Daniel A. Sumner*

- The Giannini Foundation and the Welfare of California Agriculturists in a Changing State, Nation, and World
  *Gordon C. Rausser*

- Alumni Discussion
  *C. Richard Shumway, Nicole Ballenger, Richard E. Just, and Peter Thor*
Giannini Foundation Contributions to Agricultural Marketing Studies

Julian M. Alston and Richard J. Sexton

The purpose of this paper is to review and evaluate the research activities and achievements of the economists who have served as members of the Giannini Foundation of Agricultural Economics over the past seventy-five years with specific reference to marketing of California farm products. This is a subject of very broad potential scope and it is necessary to impose limits on the scope, both as a coping strategy and to avoid overlapping too much with the other papers in this collection.

One limitation on scope will be the form of the evaluation, much of which will be strictly descriptive (i.e., nonquantitative) and largely speculative (i.e., based on factoids rather than actual evidence), partly because it is an area where quantification is difficult. Foundation members have made scholarly contributions, both directly and by having influence on the work of others, especially graduates from the departments at Berkeley, Davis, and Riverside that make up the Foundation. The resulting information and knowledge in turn has its ultimate payoff through influences on knowledge and understanding and on decisions made by managers of farms and agribusiness enterprises and in the public sector. These influences and the corresponding benefits to society, however, are notoriously difficult to demonstrate, let alone quantify, and attribute to particular causes (for instance, see Pardey and Smith (2004) and the chapters therein). Rather than seek to measure and apportion benefits, a reasonable compromise approach is to take for granted that the overall field of agricultural economics has been socially valuable and consider the roles and achievements of the members of the Foundation relative to the profession as a whole. Even so, comprehensive coverage is not feasible. An overview is provided of the range of contributions with detailed attention to some important, indicative examples.

A second limitation on the scope is imposed by defining the set of topics that are included under the rubric “marketing.” What is marketing? The marketing textbooks say “marketing isn’t just selling.” It includes business activities related to decisions about what to produce when and how, as well as merchandising roles that we first think of when marketing is mentioned. Thus marketing includes some on-farm activities, as well as activities beyond the farm gate all the way through to the final consumer. For the present purposes the key distinction is between “marketing” and “production” (which is covered elsewhere in this volume by Sumner), each of which could encompass the entire marketing chain from one perspective or another. In Sumner’s paper on production, emphasis is given to economic activities on the farm and to the resources used in production. Here, emphasis is given to
the economic activities beyond the farm gate that determine the nature of the markets for farm products and to the individual and collective actions of farmers to enhance their returns through marketing activities, with and without the assistance of the government. Hence, our coverage of scholarly work in agricultural marketing relates to the study of markets and marketing institutions, including studies of private individual and collective marketing activities, and of the causes and consequences of government intervention in the market.

This paper proceeds in the next section with a review of external factors that influenced marketing economics as conducted within the Giannini Foundation, including developments in agriculture, in the Experiment Station, and in agricultural economics more broadly, and in the parent discipline of economics. The third section presents a brief discussion of the evolving history of agricultural marketing in California and the unique nature of California agriculture and the marketing issues it faces. Against that background, the paper then provides a quantitative overview of marketing economics within the Giannini Foundation in terms of the number of publications and dissertations per year and the balance between marketing and other subfields over its more than seventy-five-year history. That section also considers other measures of leadership roles played by members of the Foundation. The paper concludes with a caveat recognizing some limitations of our work.

Influences on Marketing Economics in the Giannini Foundation

Like other applied scientists, agricultural economists are influenced by their circumstances. What we find interesting to work on depends on what is happening in the world, what is happening in our parent disciplines, and the types of resources that are available to us and the strings that are attached to them. Thus, as their circumstances have changed, we have witnessed changes in the work of the economists in the Giannini Foundation. At the time when the Giannini Foundation was first established, California agriculture and agricultural economics in the University of California were very different from today. With the evolution of the state’s agriculture, we have witnessed an evolution in the scale and focus of the agricultural economics enterprise conducted initially at Berkeley and progressively over time also at Davis and Riverside. This evolution has been influenced by the changing fortunes of the State Agricultural Experiment Station and the university more generally and by developments in economics more broadly, among other things.

Critical Features of California Agriculture

California agriculture today is large, complex, diverse, dynamic, economically important, and different in many ways from agriculture in most of the rest of the United States. With a gross value of farm output of around $30 billion in recent years, California agriculture accounts for around 12% of the national total, almost twice as much as the next largest agricultural state (Texas). This output was produced with just 3% of the nation’s agricultural land, reflecting California’s unique combination of (1) a rich natural endowment of soil and climate, (2) a very substantial public investment in research, education, and knowledge, as well as in irrigation and other infrastructure, (3) a very substantial private investment in biological and physical capital on farms, (4) highly sophisticated technology and management, and (5) an abundant supply of relatively cheap farm labor.

As Table 1 shows, the index of total California agricultural output increased from 100 in 1949 to 443 in 2002. This 4.5-fold increase in total output reflected slightly slower growth in
output of fruits and nuts, livestock, and vegetables; much smaller growth in production of field crops; and much greater growth, by a factor of fourteen, in greenhouse and nursery.\(^3\) Aggregate inputs grew by only 68% from 1949 to 2002, reflecting significant reductions in the use of land and especially labor and some increases in capital and purchased inputs. Combining the information on inputs and outputs, the index of multifactor productivity grew from 100 in 1949 to 264 in 2002, an increase in productivity of 164% over the fifty-three-year period and slightly greater than the U.S. national aggregate agricultural productivity growth of 160% over the same period.\(^4\)

California’s agricultural output consists of a diverse range of well more than 250 agricultural commodities, including a host of horticultural products for which California is an important producer (and sometimes the only significant producer), not just in the United States but in the world as a whole. The nature of the product mix and California’s importance in the specific product markets have marketing implications. For those commodities for which California is a “large-country” trader, able to influence national or world prices, there is potential to introduce marketing arrangements designed to exploit market power in trade or otherwise to manage market prices and this potential has been exploited at times. For those commodities for which California is the main or only producer, consumption necessarily occurs at a distance from production and many of these commodities are highly perishable. These factors combined give rise to questions about the economics of transport, storage, handling, and distribution; the market mechanisms for conducting transactions at long distance; and the nature of competition in the industry and the efficiency of the market mechanism. Similar questions can arise in any commodity market but they become different and perhaps more pronounced when the production is more spatially concentrated and the commodity is perishable.

In addition, many of the California specialty crops are perennials for which production is highly capital intensive, requiring substantial investments in irrigation and other infrastructure and planting materials. For these crops, the dynamic structure of supply response to price is different from that for annual crops. There are long biological lags as tree and vine stocks grow and mature, which also mean that short-run supply response is negligible and markets may be subject to periods of overcapitalization and sluggish adjustment, and yields may be subject

### Table 1. Indexes of Inputs, Outputs, and Productivity in California Agriculture 1949–2002

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</tr>
</thead>
<tbody>
<tr>
<td>Fruits and Nuts</td>
<td>100</td>
<td>99</td>
<td>111</td>
<td>106</td>
<td>130</td>
<td>129</td>
<td>174</td>
<td>217</td>
<td>233</td>
<td>246</td>
<td>278</td>
<td>379</td>
<td>390</td>
</tr>
<tr>
<td>Vegetables</td>
<td>100</td>
<td>118</td>
<td>134</td>
<td>150</td>
<td>152</td>
<td>194</td>
<td>205</td>
<td>255</td>
<td>284</td>
<td>332</td>
<td>363</td>
<td>438</td>
<td>421</td>
</tr>
<tr>
<td>Field Crops</td>
<td>100</td>
<td>93</td>
<td>118</td>
<td>150</td>
<td>152</td>
<td>157</td>
<td>243</td>
<td>282</td>
<td>265</td>
<td>259</td>
<td>250</td>
<td>254</td>
<td>232</td>
</tr>
<tr>
<td>Greenhouse and Nursery</td>
<td>100</td>
<td>106</td>
<td>141</td>
<td>196</td>
<td>245</td>
<td>278</td>
<td>409</td>
<td>607</td>
<td>726</td>
<td>962</td>
<td>942</td>
<td>1,280</td>
<td>1,442</td>
</tr>
<tr>
<td>Livestock</td>
<td>100</td>
<td>106</td>
<td>137</td>
<td>161</td>
<td>188</td>
<td>208</td>
<td>216</td>
<td>245</td>
<td>272</td>
<td>336</td>
<td>356</td>
<td>408</td>
<td>430</td>
</tr>
<tr>
<td>Total Output</td>
<td>100</td>
<td>102</td>
<td>127</td>
<td>145</td>
<td>165</td>
<td>181</td>
<td>223</td>
<td>268</td>
<td>291</td>
<td>334</td>
<td>352</td>
<td>432</td>
<td>443</td>
</tr>
<tr>
<td>Total Input</td>
<td>100</td>
<td>102</td>
<td>107</td>
<td>121</td>
<td>122</td>
<td>120</td>
<td>128</td>
<td>134</td>
<td>129</td>
<td>151</td>
<td>166</td>
<td>169</td>
<td>168</td>
</tr>
<tr>
<td>Productivity</td>
<td>100</td>
<td>101</td>
<td>118</td>
<td>120</td>
<td>135</td>
<td>150</td>
<td>174</td>
<td>200</td>
<td>227</td>
<td>221</td>
<td>212</td>
<td>256</td>
<td>264</td>
</tr>
</tbody>
</table>

Source: Figures in this table were supplied by Matt Andersen, personal communication. Data beyond 2002 are not yet available.
to significant systematic movements associated with alternate bearing patterns. Consequently, because of differences in the nature of demand, the nature of supply, or the nature of the product and how it is marketed, the relevant marketing and policy issues in California specialty crop industries may differ from those that are important for the intensive livestock and annual grain crops that predominate in other states. In particular, California produces a number of commodities for which demand is comparatively inelastic (because of California’s large market share) and supply is highly inelastic in the short run over a wide range of prices (either because it is a highly perishable crop, like lettuce, or a perennial crop, like almonds). These market characteristics can have important implications for pricing and market performance and appropriate marketing institutions.

Because of the different character of California agriculture, there is a range of economic and marketing questions that are more important for California agriculture than for agriculture in other places and less likely to have been answered for us by economists working in other places—for instance, in the U.S. Midwest. This is so both because the general issues are not so relevant when the product mix is dominated by corn, soybeans, hogs, and dairy products and because specific issues about particular California crops (e.g., wine grapes or almonds) are of no relevance at all elsewhere. This structure—where California faces a comparatively unique set of production and marketing issues that are likely to be neglected by agricultural economists and other agricultural scientists in other states—is inherent and enduring. It means that California has had to be relatively self-reliant in the study of production and markets for many of its farm products and will have to continue to be so as agriculture and agricultural marketing issues continue to evolve.

THE PROFESSIONAL AND INSTITUTIONAL CONTEXT OF THE GIANNINI FOUNDATION

Some useful perspective is gleaned by considering the Giannini Foundation in the context of the California Agricultural Experiment Station (CAES) and the University of California more generally, and also beyond that in the context of the broader national and global agricultural economics industry.

Table 2 shows the total number of members of the Giannini Foundation over time compared with (1) the total number of CAES scientists in the counterpart colleges of Agriculture, Environmental Science, and Natural Resources at Davis, Berkeley, and Riverside and (2) the total budget of the CAES. In Table 2 it can be seen that Agricultural (and Resource) Economics in

<table>
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<th>Table 2. Giannini Foundation Membership in the Context of the CAES, 1930–2000</th>
</tr>
</thead>
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<tr>
<td><strong>CAES Funding – thousands of 1999 dollars</strong></td>
</tr>
<tr>
<td>18,593</td>
</tr>
<tr>
<td><strong>CAES Scientists – full-time equivalents</strong></td>
</tr>
<tr>
<td>210</td>
</tr>
<tr>
<td><strong>Foundation Members – full-time equivalents</strong></td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td><strong>American Agricultural Economics Association (AAEA) Members – domestic total</strong></td>
</tr>
<tr>
<td>650</td>
</tr>
</tbody>
</table>

Source: Data on CAES funding and CAES full-time equivalents were taken from Valuing UC Agricultural Research and Extension published by the University of California Agricultural Issues Center in 1994. AAEA membership data were provided by Philip Pardey. Foundation member data were compiled by the authors from various sources—see notes to Appendix Table A-1.
the University of California shared in the growth of the Agricultural Experiment Station and in the corresponding colleges at Davis, Berkeley, and Riverside but that the patterns of growth were not fully congruent or consistent over space and time. These figures also provide a basis for considering the relative role of support from the Giannini Foundation compared with other resources used by members of the Foundation and other factors.

In 2005, the Giannini Foundation contributed $800,000 to the operating resources of the member departments at Berkeley, Davis, and Riverside. In that same year, a total of fifty-nine economists were employed in those departments, including fifty in professorial appointments and nine Cooperative Extension specialists. The total operating budget across the three departments was in the range of $3–4 million and the total operating cost of the enterprise, including faculty and staff salaries and benefits, was in the range of $10–12 million. Thus the Foundation contributed around $13,000 per member in 2005, perhaps 6% of the total resources used by the members but closer to 20% of the operating funds. Even though the Giannini Foundation does not provide a very large share of the total resources spent by its members, the funding is high powered because it is incremental and, at least to some extent, flexible, whereas most of the other resources are not. Accordingly, and particularly through their use to support mini-grants, Giannini funds can have and have had a disproportionate influence on the agenda of the agricultural economists.

It is relevant (and perhaps important) to recognize that, although they have some common ground, the missions of the Giannini Foundation, the CAES, and the University of California are different and perhaps increasingly so over time. In particular, the missions of the university and the Experiment Station extend well beyond California agriculture and the California agriculturalists that were the focus of the founding charter for the Giannini Foundation. In addition, it is relevant (and perhaps important) to recognize that the output from the members that is consistent with the purposes of the Giannini Foundation is only partly attributable to the Foundation. At the same time, work partially or even fully funded by the Foundation may have incidental benefits that extend beyond its charter and yet may be a very appropriate use of Foundation funds. Such considerations mean that even a notional benefit-cost analysis is complex.

DEVELOPMENTS IN THE BROADER ECONOMICS PROFESSION

Like most other disciplines, economics has been evolving in the direction of increasingly narrow individual specialization within the field in terms of subject matter or methodological focus. As the parent discipline has moved upstream into less applied (more theoretical or less empirical) research, so too has the subdiscipline of agricultural economics. In many places, so-called agricultural economists today are generally more narrowly focused and more technically oriented than their predecessors were seventy-five or even twenty-five years ago, to the extent that many of them nowadays do work that does not have much specific relevance to agriculture. To some extent, agricultural economists are occupying a gap created by the upstream movement of the parent economics discipline—a drift that has counterparts in the other disciplines represented in other departments within the College of Agriculture.

In the University of California, agricultural economists have enjoyed a particular form of academic freedom in an institutional environment that encourages and rewards particular forms of academic achievement. High rewards are conferred for publishing in more general economics journals, especially at the top tier, compared with publishing in the top field-specific journal,
the *American Journal of Agricultural Economics*, and members of the Giannini Foundation have responded to these incentives. In turn, the types of scholarly contributions being made by members of the Foundation have evolved, away from providing specific research results relevant to a particular context in California agriculture and in the direction of providing research results possibly relevant to a broader range of settings, beyond agriculture and beyond California. These developments are perfectly consonant with the missions of the university and the Experiment Station but perhaps less so with the original charter of the Foundation.

In some senses, these developments are especially appropriate when we consider the place of the Giannini Foundation in the global profession of agricultural economics. The University of California occupies a special place in a world that has depended on the United States to provide a predominant share of all science funded and conducted in both the public and the private sector. As shown by Pardey and Beintema (2000), a small number of rich countries have provided the lion’s share of global investments in all science, including agricultural research and development (R&D) and the United States has played a particularly important role in generating past global agricultural productivity improvements. Presumably the same may be said about global investments in agricultural economics as a component of the agricultural R&D portfolio—i.e., the United States has provided a disproportionate share of the world’s agricultural economics research. Recent work (Pardey, Alston, and Piggott 2006) indicates a worsening of the global underinvestment in agricultural science, and presumably that trend too will extend to agricultural economics as a component of agricultural science. These observations may have implications for how we should balance the different missions of the Foundation, the Experiment Station, and the university.

**AGRICULTURAL ECONOMICS AT THE UNIVERSITY OF CALIFORNIA**

The members of the Giannini Foundation excel relative to the agricultural economics profession more broadly by most measures used in academic comparisons, such as publication counts, citations, professional awards, and subjective peer rankings. Accordingly, the agricultural and resource economics departments at Berkeley and Davis have typically been ranked within the top two or three (and often as the top two) agricultural economics departments in the world (not just in Northern California) in most rankings over the past thirty to forty years. Yet California invests relatively little in public-sector agricultural economics.

Even though California agriculture accounts for more than 12% of the total value of U.S. farm output, a much smaller percentage of U.S. agricultural economists employed in land grant universities are employed in the University of California. Data are not available on the national total number of U.S. agricultural economists employed in land grant universities but some data are available on the numbers in the leading departments of agricultural and resource economics in 2004/05 and information is available on membership of the American Agricultural Economics Association (AAEA) over time. The AAEA had a total of 2,785 domestic members in 2000. At the time of writing, based on the classification in the AAEA’s online membership directory, California had 126 members, Illinois had 92, Maryland had 46, Michigan had 60, Minnesota had 52, and Ohio had 43. California’s 126 was less than 5% of the total membership in the AAEA, much smaller than California’s share of U.S. agricultural output.

A more relevant measure may be the number of agricultural economists employed as faculty members in departments of agricultural economics. These numbers are compared with the value of agricultural output for a selection of states in the first three columns of Table 3. The
number of agricultural economists per state may rise with the size of the agricultural sector but it generally rises less than proportionally. The states with larger agricultural sectors, like Illinois and Minnesota, had one “agricultural” economist per $359 million or less in agricultural output; the states with smaller agricultural sectors had a lower value of agriculture per agricultural economist. California, with the nation’s largest agricultural sector, had one agricultural economist in the land grant system for every $572 million of agricultural output. Moreover, a relatively high proportion of California’s “agricultural” economists are not working on California agriculture but rather are working on aspects of economic theory, natural resources and the environment, and international economic development, endeavors that have only indirect relevance for California agriculture.

In addition, recall that the total number of farm products in California is much larger than in any other state. California, with the nation’s most diverse agricultural sector, had 1.7 agricultural economists in the land grant system in 2004 for every significant agricultural output with an annual value of $100 million or more in 2002–2004, compared with 4 to 5 for Midwestern states like Illinois and Michigan. (And, as the numbers in parentheses show, California had six economists for every output with an annual value of $500 million compared with twelve to eighteen in the Midwestern states.) Marketing mechanisms and requirements differ significantly among California specialty crops (consider lettuce versus almonds versus wine grapes) and relative to the crops that dominate production in the Midwest (such as wheat, corn, and

### Table 3. Congruence of Numbers of Faculty Members, Departmental Expenditures, and Values of Agricultural Output, Selected U.S. States, 2004

<table>
<thead>
<tr>
<th>Institution</th>
<th>Dept. Size in 2004&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Value of Agricultural Output in 2004&lt;sup&gt;a&lt;/sup&gt; ($ million)</th>
<th>Agricultural Output per FTE in 2004&lt;sup&gt;a&lt;/sup&gt; ($ million)</th>
<th>Number of “Significant” Agricultural Outputs in 2000–2002&lt;sup&gt;b,c&lt;/sup&gt;</th>
<th>FTE per “Significant” Agricultural Output&lt;sup&gt;b,c&lt;/sup&gt;</th>
</tr>
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<tbody>
<tr>
<td>University of California</td>
<td>60</td>
<td>34,294</td>
<td>572</td>
<td>35</td>
<td>(10)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(6.0)</td>
</tr>
<tr>
<td>University of Illinois</td>
<td>38</td>
<td>11,634</td>
<td>306</td>
<td>7</td>
<td>(3)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(12.7)</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>22</td>
<td>2,058</td>
<td>94</td>
<td>4</td>
<td>(0)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(NA)</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>35</td>
<td>5,067</td>
<td>145</td>
<td>8</td>
<td>(2)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(17.3)</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>31</td>
<td>11,143</td>
<td>359</td>
<td>11</td>
<td>(3)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>(2.8)</td>
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<tr>
<td>Ohio State University</td>
<td>24</td>
<td>6,801</td>
<td>283</td>
<td>8</td>
<td>(4)</td>
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<sup>a</sup> Estimates for California taken from Giannini Foundation membership tables, including Cooperative Extension specialists; other estimates of FTE provided by Phil Pardey (personal communication, April 2006) and checked against departmental Web pages.

<sup>b</sup> “Significant” agricultural outputs defined as the number of commodities with a farm-level value added in the state greater than $100 million per year on average over 2000–2002.

<sup>c</sup> “Significant” agricultural outputs defined alternatively, in parentheses, as the number of commodities with a farm-level value added in the state greater than $500 million per year on average over 2000–2002.
soybeans). Further, recall that the potential for research spillovers and synergies is relatively high among the Midwestern states because they have relatively similar agro-ecologies whereas California has to be relatively self-reliant for research related to its agriculture, especially the many specialty crops.

One inference we might draw from the cross-state comparison is that agricultural economics as a field is characterized by very substantial economies of scale and scope. If we double the size of the agricultural industry in a state, it is not found necessary to nearly double the scale of the agricultural economics investment in the land grant college; similarly, if we double the scope of the industry in terms of the number of agricultural commodities (or other dimensions of the problem, such as the number of endangered species), it is not found necessary to nearly double the scale of the agricultural economics investment. An alternative inference is that there is a relative underinvestment in agricultural economics in California with its large scale and large scope of agricultural industries. This can be seen as representing a challenge and a burden to the agricultural economists in the Giannini Foundation—requiring them to be more efficient and more productive than their interstate counterparts. Alternatively, the same factors may be considered as presenting opportunities that have helped account for the remarkable success of the enterprise.

The appendix provides details on the membership of the Giannini Foundation over time with some indication of the changing field emphasis. The fields of individual faculty members were designated—somewhat subjectively but using published information and some knowledge—as (1) agricultural economics, (2) development economics, (3) environmental and resource economics, or (4) other, encompassing specializations in econometrics or other things. Some allowance was made for faculty members who spanned multiple fields but the shares were assumed to be equal and fixed over the entire period of an individual faculty member’s appointment. The figures in Appendix Table A-1 are for faculty in professorial teaching and research appointments (i.e., excluding Cooperative Extension) while the figures in Appendix Table A-2 include Extension as well.

The aggregate figures show that agricultural economics has been shrinking as a share of the economist labor force within the Giannini Foundation, which itself has been shrinking in recent years, after having plateaued from the early 1980s through the early 1990s. Other information, to be presented later, indicates that agricultural marketing, broadly defined, has held a fairly steady share of around half of the total effort in the area of agricultural economics. Hence, agricultural marketing likewise must represent a shrinking share of a shrinking total effort. Given that an increasing share of the consumer food dollar over time has been generated by off-farm activities, now up to around 80%, the comparative decline in the share of marketing in Giannini Foundation activities is even more significant.

**MARKETING CALIFORNIA FARM PRODUCTS, 1930–2005**

In 1930, California had a population of 5.7 million people and 136,000 farms. Milk cost 14¢ per quart and was still being delivered in many places by a horse and cart; bread cost 9¢ per loaf. Gasoline cost 25¢ per gallon but most people did not buy any. Horsepower was provided mainly by horses, and they in turn consumed a very
significant fraction (in the range of 10–20% in the 1920s and 1930s) of the total output from agriculture. Olmstead and Rhode (2001) reported that in 1930 sixty-three million acres of crop land were used to feed horses and mules on U.S. farms; only 13.5% of farms had a tractor (21% in California).

The year 1930 was in the midst of the agricultural depression that had begun in 1920 and lasted for twenty years and was the first year of the more general “Great Depression,” which was characterized by large-scale and long-term unemployment and depressed markets with very low prices for farm products. Farmworkers were paid as little as 25¢ per hour. It was also the time of the establishment of key legislation that underpins federal farm policy today—the Agricultural Adjustment Act (AAA) of 1933 (amended in 1938) and the Agricultural Marketing Agreement Act (1937)—as well as the counterpart legislation enacted by the State of California, the California Marketing Act of 1937. Around the world, similar legislation was being enacted by many countries at about this same time, reflecting similar forces at work and, to some extent, a loss of confidence in the effectiveness of the unfettered workings of the free market mechanism for allocating resources and achieving a satisfactory distribution of income. The same factors must have influenced the thinking of A.P. Giannini when he was defining the purpose of the Foundation he was to endow.

California agriculture has undergone large and rapid changes over the past seventy-five years, many of which have implications for markets and marketing, and these changes have influenced the working agenda of the economists in the Giannini Foundation. One of the roles of the Foundation’s economists has been to document the economic history of California agriculture. Olmstead and Rhode (2003) summarized the key features of California agricultural history over 150 years, 1850–2000, including most of the period that is relevant for the present purpose. Selected landmark events in U.S. and California agricultural history, taken from Olmstead (2006), are listed in Appendix Table A-3. These include the introduction of major pieces of legislation that govern the marketing of agricultural products, as well as some other economic events that had significant implications for agricultural marketing and the related work of members of the Foundation.

During the seventy-five-year history of the Giannini Foundation, California agriculture has been characterized by continuous, interconnected, and substantial changes in technology, markets, product mix, and industry structure. Some of these changes have mirrored general changes in agriculture nationally and globally but others have been more uniquely Californian. One important trend has been in technology, which was a particular focus of Olmstead and Rhode (2003) and was the subject of the chapter by Alston and Zilberman (2003) in the same volume. Changes in varieties, mechanization (especially of the harvest), the introduction of irrigation technology combined with expanded irrigation capacity, and improved transportation and preservation technologies allowed California to become the dominant producer of a range of Mediterranean crops at the expense of the traditional producers in Europe. Consequently, over time, the broad-acre field crops like wheat and barley have been steadily supplanted by horticultural crops. These new crops have entailed substantial investment in biological and physical capital, leading to an intensification of production that has contributed to the growth in productivity and changed the total volume of production as well as the product mix.8
Changes in the product mix have been multidimensional. As well as changes in the crops grown, we have seen very substantial product differentiation within crops—witness the expansion of the number of varieties of lettuce, strawberries, or table grapes, for example, to encompass different uses and to extend seasonal availability and the range of varieties to include natural and organic. Further product differentiation has come beyond the farm gate with the addition of a range of services associated with food—for instance, bagged lettuce and the many other forms of prepared consumer food items. The farmers’ share of the consumer food dollar has fallen, reflecting both these changes and the falling real price of farm products as raw ingredients, and this has been accompanied by a host of studies of marketing margins and related issues. These changes have been accompanied by changes in the industrial organization both of the farming industry in California and of the rest of the agribusiness industry engaged in food and fiber transport, processing, distribution, and marketing. With these changes in structure have come changes in marketing methods with a long-term trend for contractual arrangements in which farmers undertake to supply products with specified characteristics in space, form, and time to replace traditional commodity market approaches.

California agriculture is different from agriculture in most other U.S. states because of (1) the large number of diverse (and often differentiated) products grown, (2) the perishable nature of many of the products, (3) the long distance from markets both domestic and international, (4) the state’s large market share and thus the comparatively inelastic demand facing California, (5) the capital intensity and associated dynamics of supply response for California specialty crops, especially the perennials, and (6) the lack of substantial government farm support programs for most of the industry (i.e., apart from rice, dairy, and cotton). Taken together, these factors mean that agricultural marketing issues in California are often different from those that arise in other states where the commodities are produced and sold in bulk, production within individual states does not affect market prices appreciably, and substantial government interventions mitigate the vagaries of the market and the potential consequences of market power of firms.

As a consequence of these differences, the agricultural industry in California has sought solutions to its marketing problems that may not be relevant for producers in other states. Some of these solutions can be found through private individual action without any involvement of the government. Much of what has happened in the past seventy-five years in California agriculture falls into that category, including, for instance, changes in the industry’s structure through vertical integration and the use of contracts to manage the information problems that arise in California’s modern, complex form of agriculture. These developments have been much studied by members of the Giannini Foundation. Other solutions may entail collective action in which producers act together to achieve a common purpose or government intervention.

The collective action option has involved government intervention of a sort—to exempt producer groups from anti-trust restrictions or to empower them to voluntarily form an organization that becomes mandatory if a sufficient majority supports it. Giannini Foundation members have worked extensively on such schemes, which include mandated marketing programs and voluntary cooperatives.
The failure of the voluntary cooperatives to achieve the lofty goals set for them inspired the creation of these mandated programs. Other forms of government intervention do not entail producer participation and may not be supported by a majority of producers but are done in consideration of broader public purposes. These interventions, too, have been studied by Giannini Foundation members.

**Overview of Marketing Economics in the Giannini Foundation**

An assessment of marketing economics in the Giannini Foundation can be conducted by reviewing the published research of the members and this section is devoted to doing that. Much of the work conducted by members of the Foundation is oriented to more general questions related to broader economic issues, to theoretical questions, or to techniques and methods and is not associated with agricultural “marketing” per se but may have relevance for more applied or empirical agricultural economics work in California or elsewhere. Thus, work may be relevant to the mission of the Foundation even when the relevance is not obvious. Conversely, contributions of a more general sort are often the result of problem solving, which may be done in the context of a specific project that is directly relevant to the Giannini Foundation. For reasons of this sort, it is not easy to clearly distinguish “agricultural marketing” work from other work. Further, the achievements and contributions extend beyond the publications in several dimensions that are harder to assess. Some of the achievements are made indirectly through the students trained by Foundation members and it is not clear how (or whether) we should count those indirect contributions to the literature. Some of the contributions are made through the development of institutions such as the International Agricultural Trade Research Consortium (IATRC). Some are made through bringing the results of analysis to bear and influencing decisions by industry or government.

**Marketing Publications by Members of the Giannini Foundation, 1930–2005**

The previous sections (based on a type of “induced innovation” argument) documented major developments and issues in California agriculture that influenced the work of the members of the Giannini Foundation, tempered by the influence of the evolving broader mission of the university and the Experiment Station and the disciplinary drift occurring within economics more broadly and agricultural economics as a part of that. Through this work, the members of the Giannini Foundation have made critical contributions to economic understanding of California issues and broader contributions to economic understanding of agricultural issues nationally and globally. They have made practical and empirical contributions but also more technical contributions to economic theory and methods used by economists. The scope, size, and evolving nature of these contributions can be seen by considering the publications that are the most tangible evidence of the effort. In the seventy years ending in 2000, members of the Giannini Foundation published more than 9,000 items (Table 4) of which more than 3,700 (41%) dealt with topics that fit under the broad concept of “marketing” when it is defined to encompass studies of markets for farm commodities, including all economic activity beyond the farm gate in the food and fiber chain, and government policy and programs related to those economic activities.
It is not possible to explicitly represent everything contained in that very large contribution to the agricultural economics literature. Some perspectives can be gleaned by reviewing the specific focus of doctoral dissertations and Giannini Foundation monographs over time, as shown in Tables 5 and 6. Table 5 shows that, over the period 1930 to 2005, a total of 492 dissertations were completed at Berkeley and, since 1967, a further 260 at Davis, making a total of 752 for the two departments. After a steady climb through the 1950s and 1960s, the rate of production held fairly steady at around fifteen per year in the 1970s and 1980s and around seventeen per year in the last fifteen years.

These dissertations are classified loosely as either agricultural economics or nonagricultural economics and agricultural economics was divided broadly into marketing (including policy) and other agricultural economics. Some interesting patterns are revealed. Over the entire seventy-five years and across the two campuses, marketing topics accounted for only 12% of the dissertations and other agricultural economics topics accounted for only 24%, with two-thirds of the total on nonagricultural economics topics. More striking is the trend over time with nonagricultural economics topics accounting for a steadily rising share of the total, especially at Berkeley, and the number that addressed marketing shrinking.

Table 6 shows the distribution of publications of Giannini monographs and the predecessor series, *Hilgardia*, since it began in 1950 over time and across the same categories as used for the dissertations. These publications have been specifically designated for agricultural economics topics and about 40% of them have been about subjects that fit into “agricultural marketing.”

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**Table 4. Publications by Members of the Giannini Foundation, 1930–2000**

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Source: Compiled by the authors using data supplied by Daniel Sumner. Numbers prior to 1995 were based on the listings in *Economic Research of Interest to Agriculture* published triennially (1951–2000) by the Giannini Foundation Library, University of California, Berkeley, and these numbers included a range of types of publications, including mimeographs and so on. Numbers after 1995 were based on publications reported in the *Giannini Reporter* and these only include “List 1” publications such as refereed journal articles, books, and book chapters.

Notes: The *Giannini Reporter* classifies publications by Giannini Foundation members into nine categories. These were condensed into the three classes listed here as follows: Marketing: Marketing and Trade, Policy. Other Agric.: Economic Development, International, Production, Finance. Nonagric.: Microeconomic Theory, Human Resources, Community Development and Consumer Economics, Natural Resources and Environmental Economics, Quantitative Methods, Other.
### Table 5. Doctoral Dissertations by Students in the Departments of Agricultural and Resource Economics at Berkeley and Davis, 1930–2005

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**Percentage of Column Total**

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Source: Compiled by the authors using data supplied by Daniel Sumner derived from the *Annals of the Giannini Foundation of Agricultural Economics*.

Notes: Dissertations were categorized by Conner Mullally and Chris Gustafson based on the titles of the documents. Classifications are similar to those described in the note for Table 4.
Most of the activity in the monograph series was during the period 1960–1980, reflecting both the interests of the members and periodic changes in the faces and policies of the editors of the series.

Leadership Roles by Members of the Giannini Foundation

The members of the Giannini Foundation and their former students tend to be disproportionately represented in the literature. One example of this is provided by the *Handbook of Agricultural Economics* (Gardner and Rausser 2001), which is a part of the prestigious Elsevier series of *Handbooks in Economics*. It is not surprising that one of the two editors for the *Handbook of Agricultural Economics* was a member of the Giannini Foundation. Perhaps more interesting is the representation of the Giannini Foundation among the authors of the chapters in the handbook, as summarized in Table 7.

As Table 7 shows, 29.2% of the authors of chapters in the handbook were members of the Giannini Foundation and a further 26.2% were graduates from the Department of Agricultural and Resource Economics at Davis or Berkeley. Thus, more than half of the authors are either members of or graduates from Foundation departments. The Giannini Foundation share is greater yet for the parts of the handbook dealing with marketing (broadly defined to include policy as well), Parts 2 and 5, for which 60–70% of the authors are either members of or graduates from Giannini Foundation departments.

Members of the Giannini Foundation have been active in various leadership roles within the profession and otherwise, on and off campus, in ways that do not necessarily show up in lists of publications. The faculties at Davis and Berkeley were instrumental, for instance, in establishing the IATRC, which is funded jointly by the USDA and the Canadian government. This institution has significantly enhanced research and communication about agricultural trade...
policy with particular reference to the General Agreement on Tariffs and Trade (GATT) and its successor, the World Trade Organization (WTO). Members of the Giannini Foundation have played significant roles in contributing tailored research programs that feed into other policy processes. Some of these processes are periodic and recurring, such as the U.S. Farm Bill cycle, while others are more episodic in nature, such as the Canada U.S. Trade Agreement or the subsequent North American Free Trade Agreement, each of which engendered demand for work by agricultural economists both before and after being implemented and involved specific issues of interest to California that were not necessarily the same as those of other states. The congressionally mandated “Embargo Study” (McCalla et al. 1986) is another good example of a case where events in the world—the U.S. embargo against wheat exports to the Soviet Union—led to a demand for analysis that was met with leadership and other participation from members of the Giannini Foundation and other members of the IATRC. In addition, Foundation members have contributed in an ongoing way to addressing marketing and policy problems in California through their leadership roles and other contributions to the work of the University of California Agricultural Issues Center and the now defunct Center for Cooperatives, both of which have been closely affiliated with the Department of Agricultural and Resource Economics at Davis but also enjoyed significant involvement of colleagues from Berkeley and Riverside.

### Table 7. Giannini Foundation Authors in the Handbook of Agricultural Economics

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Note: Numbers in the table refer to authors of chapters in the handbook and the numbers in italics express the numbers of authors as percentages of the row totals that represent the total number of authors of chapters in that part of the handbook.
CONCLUSION AND CAVEAT

This paper was written as a companion to the one by Sexton and Alston, which follows. The aim in writing these two papers was to review and evaluate the applied research activities and achievements in the area of agricultural marketing of the economists who have served as members of the Giannini Foundation. 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 present 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 next paper). An unfortunate side-effect of our chosen approach is that we have said nothing specific about the contributions of Foundation economists to other aspects of the agricultural marketing field and we have, as a consequence, failed to mention some seminal contributions by Foundation members. However, as noted, our purpose was not to be comprehensive but to try to be representative. We hope that 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. Sumner (2006) and various others (e.g., Kuminoff, Sumner, and Goldman (2000, 2005); Johnston and McCalla (2004); and various authors in Siebert (2003)) discuss and document the current structure and recent history of California agriculture.
3. The output mix has shifted significantly away from traditional field crops (from 22% to 7%) and livestock (from 39% to 23%) to higher value, more diverse, and more capital-intensive forms of agriculture (from 34% to 53% for fruits, nuts, and vegetables combined and from 3% to 15% for greenhouse and nursery products).
4. It is notable that productivity was relatively flat during the 1990s and then grew again at the end of the series, possibly reflecting a period of capital investment during the 1990s—particularly an expansion in perennial crops—that began literally to bear fruit relatively recently.
6. In the 1930s, the Giannini Foundation had only ten members and five associate members (holding Extension appointments), all at Berkeley, and presumably contributed a greater share of operating and total expenses.
7. California’s top twenty commodities in 2004 included milk and cream ($5,366 million), grapes ($2,757 million), nursery products ($2,650 million), almonds ($2,200 million), cattle ($1,634 million), lettuce ($1,462 million), strawberries ($1,219 million), tomatoes ($1,091 million), hay ($1,010 million), cotton ($807 million), chickens ($715 million), broccoli ($625 million), oranges ($563 million), carrots ($448 million), pistachios ($444 million), walnuts ($439 million), avocados ($380 million), rice ($352 million), and peppers ($352 million). Several of these include more than one distinct commodity (e.g., wine and table grapes, fresh and processing tomatoes, and cut flowers versus other nursery products), each of which is worth more than $500 million per year.
8. As always, large changes, especially technological ones, are not embraced by everyone affected by them. In California agriculture these tensions came to a head with the ending of the Bracero program, which stimulated the introduction of the tomato harvester that had been developed with the involvement of the University of California. The resulting controversy over the alleged displacement of farmworkers and ensuing lawsuit led to several studies of the economic impact of the harvester by Foundation members, including Schmitz and Seckler (1970), Brandt and French (1982), and Martin and Olmstead (1985).

9. Indeed, the issue of collective action to manage markets was a primary focus of members in the early years of the Giannini Foundation, as discussed by Sexton and Alston (this volume).

10. Authors who are members of the Giannini Foundation include (in alphabetical order) Julian Alston, Alain de Janvry, Rachael Goodhue, Larry Karp, Jeffrey LaFrance, Philip Martin, Alex McCalla (emeritus), Jeff Perloff, Gordon Rausser, Elizabeth Sadoulet, Richard Sexton, Daniel Sumner, David Sunding, J. Edward Taylor, Jeffrey Williams, Brian Wright, and David Zilberman. Authors who are alumni of the Giannini Foundation departments include (in alphabetical order and including some who are also current members of the Foundation) Pier Ardeni, David Bessler, Robert Chambers, Alain de Janvry, Harry De Gorter, Gershon Feder, John Freebairn, Richard Just, Rachael Goodhue, Robert Innes, Jennifer James, Larry Karp, Jeffrey La France, Nathalie Lavoie, Erik Lichtenberg, Yair Mundlak, Rulon Pope, Gordon Rausser, Arthur Small, David Sunding, J. Edward Taylor, James Vercammen, Michael Wohlgenant, and David Zilberman.

11. At the risk of exacerbating this error of omission, let us note some of the book- or monograph-length contributions that we have in mind. The work by Raymond Bressler and Richard King (1970) is a classic in the field that laid a foundation for several different lines of work on spatial markets and market structure. Several members at both Berkeley and Davis have worked on the analysis of demand for farm products. The Giannini Foundation monograph by P.S. George and Gordon King (1971) is regarded as a classic within this literature. The definitive reference on the application of welfare economics is the 1982 book by Richard Just, Darrell Hueth, and Andrew Schmitz. The classic work on the economics of storage and commodity markets is the 1991 book by Jeffrey Williams and Brian Wright.

REFERENCES


## APPENDIX

### Table A-1. Giannini Foundation Membership over Time

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Source: Foundation member data compiled by the authors from various sources, including various issues of The Giannini Reporter, various issues of the UC Davis catalog, and tables supplied by Grace Dote showing employment dates for faculty.
### Table A-2. Giannini Foundation Membership over Time, Including Cooperative Extension

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Source: Foundation member data compiled by the authors from various sources, including various issues of *The Giannini Reporter*, various issues of the UC Davis catalog, and tables supplied by Grace Dote showing employment dates for faculty.
<table>
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<th>Year</th>
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<td>1862</td>
<td>President Lincoln approved the Homestead Act and the Morrill Land Grant College Act.</td>
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<td>1868</td>
<td>A refrigerator car widely used by railroads in the 1870s was patented by William Davis.</td>
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<tr>
<td>1872</td>
<td>Luther Burbank produced the Burbank potato, the first of a long series of new or improved varieties of vegetables, fruits, and flowers.</td>
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<tr>
<td>1873</td>
<td>The “Washington navel” orange was introduced to California from Brazil.</td>
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<tr>
<td>1875</td>
<td>The California Agricultural Experiment Station was founded by Eugene W. Hilgard.</td>
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<tr>
<td>1887</td>
<td>The Hatch Experiment Station Act was approved, providing federal grants to states for agricultural experimentation.</td>
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<tr>
<td>1888</td>
<td>Refrigerated rail cars were used to ship meat and to long-haul fruit from California to New York.</td>
</tr>
<tr>
<td>1892</td>
<td>The first successful gasoline tractor was built by John Froelich.</td>
</tr>
<tr>
<td>1895</td>
<td>Sunkist Growers, Inc., for many years called the California Fruit Growers Exchange, was incorporated as the Southern California Fruit Exchange.</td>
</tr>
<tr>
<td>1906</td>
<td>The Holt Company produced a caterpillar tractor powered by a gasoline engine. The Pure Food and Drug Act was approved.</td>
</tr>
<tr>
<td>1914</td>
<td>The Smith-Lever Cooperative Agricultural Extension Act, which formalized cooperative agricultural extension work, was introduced.</td>
</tr>
<tr>
<td>1920/21</td>
<td>Agricultural prices plunged and remained low for the next twenty years.</td>
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<tr>
<td>1922</td>
<td>The Capper-Volstead Act declared that a cooperative association was not, by reason of the manner in which it was organized and normally operated, a combination in restraint of trade in violation of federal anti-trust statutes.</td>
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<td>1926</td>
<td>Henry Wallace developed commercial hybrid seed corn. Congress passed the Cooperative Marketing Act.</td>
</tr>
<tr>
<td>1927</td>
<td>John D. Rust patented the first successful spindle cotton picker.</td>
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<tr>
<td>1929</td>
<td>The Mediterranean fruit fly was discovered in Florida and an all-out program was instituted to combat it.</td>
</tr>
<tr>
<td>1930</td>
<td>The Plant Patent Act was approved.</td>
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<td>1933</td>
<td>The Agricultural Adjustment Act was approved and the Commodity Credit Corporation was established.</td>
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<tr>
<td>1935</td>
<td>The Rural Electrification Administration was established by Executive Order 7037 and was incorporated into the U.S. Department of Agriculture on June 1, 1939. A one-man combine was developed for harvesting wheat.</td>
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<tr>
<td>1937</td>
<td>The first soil conservation district in the United States was organized.</td>
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<tr>
<td>1938</td>
<td>The Agricultural Adjustment Act of 1938 replaced the Agricultural Adjustment Act of 1933.</td>
</tr>
<tr>
<td>1946</td>
<td>The Research and Marketing Act was signed.</td>
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<tr>
<td>1949</td>
<td>The usefulness of antibiotics in promoting animal nutrition was demonstrated. The Agricultural Act of 1949 became the “permanent” legislation upon which most subsequent farm subsidy programs were appended.</td>
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<tr>
<td>1959</td>
<td>The mechanization of specialty crops proceeded with the introduction of the first mechanical cherry picker and the development of the mechanical tomato harvester.</td>
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<tr>
<td>1968</td>
<td>96% of all U.S. cotton was being harvested mechanically.</td>
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<tr>
<td>1970</td>
<td>The Plant Variety Protection Act was passed.</td>
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<tr>
<td>1994</td>
<td>The Uruguay round of the WTO marks a milestone in the movement to reduce export subsidies and promote trade by opening world markets.</td>
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<tr>
<td>1996</td>
<td>Genetically engineered, herbicide-tolerant soybeans become available to farmers.</td>
</tr>
<tr>
<td>2000</td>
<td>Genetically modified cotton was planted on more than 60% of U.S. cotton acreage.</td>
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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. 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.

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).

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). 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. 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.” 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. 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, 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.

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. 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
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. 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. 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 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
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 mar-
kets 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 disserta-
tion, 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 rep-
resent 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 conclu-
sions 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. Helmberger 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 $T_t$ 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 Helmberger 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 statics 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 Giannini 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.

References


Erdman, H.E. “Possibilities and Limitations of Cooperative Marketing.” University of California, Agricultural Experiment Station Circular 298, revised, 1942.


Stokdyk, E.A. “Economic and Legal Aspects of Compulsory Proration in Agricultural Marketing.” University of California Agricultural Experiment Station Bulletin 565, 1933a.


Seventy-five years is a long time—at least long enough for one to hope to see some return on an investment. Over a seventy-five-year period, the Giannini Foundation of Agricultural Economics has helped support the research of almost 3,000 economist-years. Over that period, members of the Foundation have produced more than 10,000 pieces of research that have ranged from policy briefs, budget bulletins, and Extension speaking notes to academic journal articles and books. They have also supervised almost 800 Ph.D. dissertations completed by students of agricultural and resource economics at Berkeley and Davis.

Early documents of the Foundation indicate support for very broad mandates concerning economic consequences of agricultural production (including “overproduction”), acquiring supply and demand information useful in advising California farmers, and all economic questions affecting farmers and their families. Twenty years after the Foundation’s initiation, Robert Sproul (1951) summarized his understanding of the purposes of the Foundation as “to study and make better known the economic facts and conditions upon which the continued solvency and prosperity of California’s agricultural industry must, of necessity, rest.” Here there is an almost explicit assumption that economic well-being of agriculture is paramount. Such an assumption is consistent with the language and tone of the original Foundation documents, which clearly indicate that the Foundation was to support research on the economics of agriculture to the benefit of farmers in California. However, given this objective, it is also clear that the founders accepted a broad and inclusive vision of the economic research that could serve agriculture in the state.

This brief paper explores the evolution of research by members of the Giannini Foundation in the context of the evolution of California agriculture. It would be easy to simply document that research as it has been well recognized within academic circles with numerous awards and other such indicators of quality. Members have been national research leaders and served with distinction in government and other professional pursuits outside of their roles as academic researchers and Cooperative Extension specialists. This success is not cataloged here. Instead, the paper attempts to give a flavor of the research efforts and their relationship to agriculture in the state. The goal is to document the connection between supported research and contributions and the primary stated objectives of the Foundation.
This paper first outlines very briefly the evolution of production agriculture in California from about 1930 to the present. This section relies on data from USDA and uses the Giannini Foundation report by Johnston and McCalla (2004) to document the shifts in commodities and issues that have been important over the decades. Next comes documentation of publications by Foundation members and a discussion of the relationship between agricultural trends and research trends. This section also provides data on doctoral dissertations, which are an important part of the research supported by the Foundation. The paper then describes some of the commodity situation and outlook publications that were an important contribution of the Foundation in its formative years but have since become less prominent. It then discusses in somewhat more detail a few representative publications that highlight the topics and approaches in agricultural supply economics over the first half of the life of the Foundation. The paper concludes with reflections on the overall contribution of the Giannini Foundation to the success of California and world agriculture.

SEVENTY-FIVE YEARS OF CALIFORNIA AGRICULTURE AND ECONOMIC RESEARCH

The Giannini Foundation began in 1928 as California agriculture was continuing its long-term shift from field crops toward more intensive crops such as vegetables, tree and vine fruit, and other horticultural commodities. This trend has continued to the present. The number of irrigated acres had already grown substantially—to about 4.75 million acres in 1929—with irrigated crops replacing dry land wheat on the floor of the Central Valley (Table 1). Grazing was important in the state, as it remains today, but the focus of grazing in California shifted from sheep to cattle (Johnston and McCalla 2004; Benedict 1946). From 1929 to 1949, the number of farms in California remained stable but the number of acres of land, harvested crop land, and irrigated crop land all rose (Table 1). Harvested crops and irrigated fields have remained minority uses of land in the state’s farms, meaning that grazing has continued to be the primary agricultural use.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Farms in 1,000s</th>
<th>Land in Farms in Acres</th>
<th>Crop Land Harvested in 1,000 Acres</th>
<th>Irrigated Land in Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929</td>
<td>136</td>
<td>30,443</td>
<td>6,549</td>
<td>4,747</td>
</tr>
<tr>
<td>1939</td>
<td>133</td>
<td>30,524</td>
<td>6,534</td>
<td>5,070</td>
</tr>
<tr>
<td>1949</td>
<td>137</td>
<td>36,313</td>
<td>7,957</td>
<td>6,599</td>
</tr>
<tr>
<td>1959</td>
<td>99</td>
<td>36,888</td>
<td>8,022</td>
<td>7,396</td>
</tr>
<tr>
<td>1969</td>
<td>78</td>
<td>35,328</td>
<td>7,649</td>
<td>7,240</td>
</tr>
<tr>
<td>1978</td>
<td>73</td>
<td>32,727</td>
<td>8,804</td>
<td>8,505</td>
</tr>
<tr>
<td>1987</td>
<td>83</td>
<td>30,598</td>
<td>7,676</td>
<td>7,596</td>
</tr>
<tr>
<td>1997</td>
<td>74</td>
<td>27,699</td>
<td>8,543</td>
<td>8,713</td>
</tr>
<tr>
<td>2002</td>
<td>80</td>
<td>27,589</td>
<td>8,466</td>
<td>8,709</td>
</tr>
<tr>
<td>2007</td>
<td>81</td>
<td>25,365</td>
<td>7,633</td>
<td>8,016</td>
</tr>
</tbody>
</table>

Source: Olmstead and Rhode, chapter 1 in Siebert, California Agriculture: Dimensions and Issues (2004); 2007 Census of Agriculture.
Table 2 shows that oranges were the top commodity in the state in 1930 and 1940 and the importance of the orange industry is reflected in the research conducted by Foundation members in those early years. Table 2 shows that dairy products were second in terms of cash receipts in 1930. As the population in urban centers increased, dairy farming that focused on supplying the milk market grew as well. (More recently, the California dairy industry has become a major producer of processed dairy products for national and international markets.) The movement of agriculture north, away from urbanizing Southern California, appears in the shift in commodity mix over the years (Table 3).

As documented in the next section, California’s agricultural commodity mix has been important in determining research topics for Foundation members. The geographic shift in agriculture is also reflected in changes in patterns of Foundation research, which focused more on Southern California fruit issues in the early years. Representative contributions include those by Erdman and Fuhriman (1929), Wellman (1932), and Shear and Pearce (1934).

Tables 2 and 4 indicate the relative rise of cattle and calves as a commodity in California and the relative decline of oranges in the first half of the period. In 1950, field crop production peaked at 20% of California’s agricultural cash receipts and then began a gradual decline (Table 4). Figure 1 shows the growth and subsequent decline of grain crops and especially of cotton. Between the 1950s and the mid-1980s, grains and cotton returned as important commodities. Figure 2 documents how grapes have replaced oranges as the most important tree and vine crop. More recently, notice that almonds have risen rapidly (as have tree nuts as a group).

**Giannini Publications from 1929 to 1999**

Next, consider the mix of topics chosen for research by Foundation members. Figure 3 classifies more than 9,000 publications by Giannini Foundation members into nine areas according to classifications established by the Foundation’s librarians. This classification scheme has changed over time, requiring the collapsing of some categories that were used occasionally in various years into the nine referenced here. Studies on “cooperatives and futures markets” were assigned to Marketing and Trade and studies...
on “situation and outlook” and “farm management” (listed in early years) were assigned to Production and Finance. Naturally, there is room for error in making these assignments, but this scheme seemed to best capture the general thrust of the research trends.

Figure 3 indicates that Marketing and Trade, comprising almost 36% of Foundation research publications, was by far the leading category of research between 1929 and 1999. Three categories each accounted for about 13–16% of the publications: Production and Finance, Natural Resources and Environmental Economics, and Human Resources, Community Development, and Consumer Economics.

**Table 4. Share of Major Commodity Groupings in Total Agricultural Cash Receipts, California, 1930–2007 (Percent)**

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle and Calves</td>
<td>8</td>
<td>14</td>
<td>19</td>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Poultry and Other</td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Dairy</td>
<td>13</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Vegetables</td>
<td>17</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Fruits and Nuts</td>
<td>36</td>
<td>21</td>
<td>20</td>
<td>27</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>Greenhouse and Nursery</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Field Crops</td>
<td>9</td>
<td>20</td>
<td>13</td>
<td>12</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>


**Figure 1. Real Cash Receipts of Selected California Field Crops, 1930–2007**

Note: Cash receipts deflated by Bureau of Economic Analysis implicit gross domestic product deflator.
Figure 2. California Orange and Grape Real Cash Receipts, 1930–2007

Note: Cash receipts deflated by Bureau of Economic Analysis implicit price deflator.

Figure 3. Proportions of Publications by Field, 1929–1999

Source: Giannini Foundation publication files.
Of course these categorizations can be problematic when trying to isolate research that is focused on California’s commodity agriculture. A study on management of hired farm labor, for example, could be focused mainly on production agriculture but be listed under Human Resources. Similarly, research on demand for the state’s farm products could have been assigned to Consumer Economics.

Figure 4 dramatically demonstrates the rapid growth of the rate of publication over time by category. Giannini Foundation members published about 250 studies in the 1930s and about ten times that number in the 1990s. Big jumps occurred from the 1950s to the 1960s and from the 1970s to the 1980s and 1990s. Some of the increase is attributable to a rising number of researchers and students but the rate of publication per member also grew. It is instructive to note that the size of the staff increased during the first six decades and then began falling significantly from the 1980s to the 1990s (Giannini Foundation Annals 2006).

Figure 5 presents a stacked bar chart by decade for shares of publications among the categories. Through the 1950s, Marketing and Trade accounted for nearly one-half of the publications and Production and Finance accounted for almost one-quarter. In the 1960s, Marketing and Trade jumped to 60% of the total and Production and Finance fell to less than 10%. Natural Resources and Environmental Economics grew to about 17% of all publications during the 1960s. The three decades since 1970 have mirrored the full period—about 15% fell into Production and Finance, 25–30% into Marketing and Trade, and about 15% into Natural Resources and Environmental Economics.
Resources and Environmental Economics. Since the number of publications per member has been so much greater in recent years, the period between 1970 and 1999 dominates the seven-decade totals.

International Economic Development was not listed prior to the late 1970s. In the past two decades, then, Economic Development has accounted for about 8% of all publications (Figure 5). Quantitative Methods and Economic Theory have been fixtures in members’ research throughout the Foundation’s seventy-five-year history. In the 1990s, these categories accounted for about 8% of total publications, down slightly from the 1970s but up from the less than 5% of publications in the early decades.

The Great Depression of the 1930s dominated California agriculture during the early years of the Foundation’s existence so it likewise permeated the members’ research efforts. How farmers coped with low prices and price fluctuations were early themes. Beginning with the New Deal, considerable Foundation research related to government subsidy and marketing policies. In the early days, Benedict, Tinley, and Tolley were leading figures. For a magisterial treatment with complete citations, see Benedict (1953). Throughout the 1930s, the Foundation supported research that provided a background for understanding government policies and occasionally made a direct evaluation of the consequences of newly established government programs. Because most of California agriculture was devoted to commodities that were less directly affected by the big commodity subsidies, much of the policy-relevant work was devoted to marketing questions in support of analysis of marketing orders for the state’s commodities. Nonetheless, the share of work that was labeled as policy was only about 7% at the time and that share has remained at less than 10% since (Figure 5).

An important output of the Giannini Foundation has been support for dissertations supervised by members. These dissertations are classified into ones that deal directly with California agriculture and ones that do not using the entire set of dissertations that were completed between 1917 and 2005.
The dissertations were sorted into topics based on their titles. Inclusion of a dissertation as closely relating to California agriculture required an evident link between the dissertation’s title and an issue of specific importance to the state’s agricultural industry.

Obviously, using only titles has limitations—a dissertation may have a strong connection to agriculture but may fail to make that link evident in the title. One might, for example, develop a methodology that is then applied to an issue of interest to agriculture in the state but the application was not considered important enough to include in the title. In that sense, then, the author and the dissertation committee were relied upon to signal, through the title, whether the application was significant or simply incidental to the main thrust of the work.

In addition, in the broadest sense, almost all of the dissertations are somewhat relevant—a tool from mathematical economics may later be applied to the state’s agricultural economics. Furthermore, one may plausibly argue than any specific application in environmental economics or economics of less developed countries has a link back to California agriculture.

But using such broad indicators would render the classification meaningless so the approach here was not so catholic. Dissertations most clearly dealing with California agriculture were easy cases. A dissertation with a title that mentioned a specific crop produced in California and that was not applied solely to a developing country was included. Also included were dissertations dealing with trade or governmental policies in other countries with which the United States trades. Dissertation titles specifying governmental policies in the United States and titles dealing with inputs into California agricultural production—labor, land, water, genetic resources, pest management, technological advances, research and development, and conservation, for example—were included. Finally, all dissertations dealing with consumer demand for agricultural products were included.\(^2\)

**Figure 6. University of California Doctoral Dissertations in Agricultural and Resource Economics per Triennium – Total and Those Dealing with California Agriculture**

Source: Giannini Foundation dissertation files.
Figure 6 divides the dissertations into three-year periods and shows that the number of dissertations supervised grew rapidly—from about ten per three-year period in the early 1950s to almost fifty in the late 1960s. Numbers then stabilized at around forty through 1987 before rising to sixty a decade later. The number of dissertations directly related to California agriculture rose to about twenty per three-year period in the 1950s and remained at that level or slightly less before declining gradually in the 1990s. The share of dissertations focusing on topics directly connected to California agriculture declined for most of the 1990s, with some rebound in the last few years.

Figure 7 shows the relationship between the distribution of commodities listed in dissertation titles and the distribution of value of agricultural production by commodity group. Overall, the mix of commodities among the dissertations mapped closely the gross value of California agricultural production, at least until the most recent three decades. In the 1980s and 1990s, there was a larger share of dissertations on field crops and a smaller share on tree crops and vegetables than would be warranted by the shares these crops held in production value. One can speculate that interest in trade issues and the national and global importance of grains may have influenced these choices, or perhaps the influx of Canadian and Australian appointments is a simpler explanation.3

EXAMPLES OF GIANNINI FOUNDATION RESEARCH ON AGRICULTURAL SUPPLY AND RELATED TOPICS

To understand the history of the Foundation in the early years, let us review a few of the important or prominent papers that relate directly to California agricultural supply in the early 1930s. Given that others will deal with trade, resources, and marketing, this paper focuses on the supply side. This section discusses research contributions and the following section deals with

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**Figure 7. Distribution of California Value of Production and Commodity-Based Dissertation Titles by Decade, 1950s through 2000s**

- **Field Crops**
- **Livestock**
- **Fruit and Vegetables**

<table>
<thead>
<tr>
<th>Decade</th>
<th>1950s</th>
<th>1960s</th>
<th>1970s</th>
<th>1980s</th>
<th>1990s</th>
<th>2000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
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</tbody>
</table>

Note: “V” stands for value of production and “D” for dissertation topic.

situation and outlook reports. The Foundation also contributed outreach publications and statistical compilations. Finally, no attempt has been made to select the most important or path-breaking research. Rather, this section discusses a few representative studies that are likely to be interesting now because of the topic, the authors, or the context. Most of the example publications were published in the *Journal of Farm Economics* (now the *American Journal of Agricultural Economics*), the premier academic journal in the field, although many were also published in preliminary or extended form in Giannini Foundation publications.

Before reviewing these representative studies from the first three decades of the life of the Foundation, we should note that an important tradition of Foundation members has been to periodically review and reconsider issues and research topics. This is not an official Giannini policy but has been the consequence of researchers pursuing their own agendas. A representative example is the series of research papers on joint production of pollination services and honey. Unlike those among the economics profession who wrote on “externalities” involved in bee economics without knowing anything about the industry, Giannini economists focused directly on the commercial bee industry, its economic contributions, and markets for the two main products—honey and pollination services. Research started with two papers by Voorhies, Todd, and Galbraith (1933a, 1933b). After several additional studies in the early years, pollination research continued with J.W. Siebert (1978, 1980), Olmstead and Wooten (1987), and Willett and French (1991) and is being revisited currently at both Berkeley and Davis.

Having mentioned the farm economics work of Kenneth Galbraith and his coauthors, note the contribution to production economics by Peterson and Galbraith (1932). In the *Journal of Farm Economics* they wrote on the concept of marginal land in agricultural supply. Peterson was a newly appointed assistant professor trained by John D. Black at Harvard and Galbraith was a graduate student and part-time lecturer at UC Davis who was soon to join the Harvard faculty under Black’s leadership. The authors began with references to Marshall’s *Principles of Economics* (1890, 1920) and his treatment of marginal economics. As might be expected for the period, they developed this marginal argument with no use of formal mathematics. They noted that the rent is zero on marginal land and, therefore, a small decline in yield or output price would cause the land to drop out of production. The reasoning was developed using examples that included land on the western slope of the Sierra Nevada range. They reasoned that, as one moves east from the Central Valley floor, elevation, slope, terrain, climate, and soil quality all change gradually. And at some point we find land that is just on the margin of cultivation. The authors generally spoke of marginal land as being of relatively low quality. There was little appreciation of nonfarm opportunity cost. There also was no appreciation, even in the 1930s, that in California one margin of cultivation was the urban edge where the high value of the land for other uses meant that the relative returns to farming on that land might be zero or negative, even for crop land deemed to be of high quality by most physical measures. That is, much of the analysis emphasized the physical nature of land rather than its economic characteristics. It is also true that, despite specific examples from California, the purpose of the paper was to clarify concepts and theory, not to apply those concepts to specific agricultural issues.
Siegfried von Ciriacy-Wantrup, writing in 1941, attempted to clarify the still vexing topic of joint production and joint costs. Some inputs are used in more than one output in a multiproduct firm and allocation of costs across outputs is troublesome and to some degree arbitrary. Ciriacy-Wantrup listed three classes of joint costs: jointness in process, jointness in time, and jointness in risk. (Chester McCorkle (1955) stressed the importance of these ideas in applying linear programming to farm management but this paper leaves to specialists to define just what these mean and how they apply in linear programming.) Ciriacy-Wantrup noted the importance of fixed assets in the context of joint costs in agriculture and discussed how choice of farm size and diversification related closely to notions of joint costs. The following year, Ciriacy-Wantrup (1942) applied the concept of joint costs to the issue of private incentives for conservation and moved a step closer to the field of resource economics with which his reputation is now much more associated.

Gordon King (1956) provided insightful discussion of Nerlove’s 1956 meeting paper, “Estimates of Elasticity of Supply of Selected Agricultural Commodities.” Of course, Nerlove’s research launched a revolution in agricultural supply econometrics and King recognized its importance. King emphasized his agreement with Nerlove’s focus: “The paper presented by Marc Nerlove emphasizes the need for reconsideration of results obtained from statistical estimates of supply response from time series data. He has made a substantial contribution in the formulation and application of price expectations models to the estimation of supply . . . His position is that many statistical estimates of supply response have been too low . . . because of incorrect formulation of the price factor to which farmers react” (King 1956, p. 509).

King then broadens the Nerlove agenda and states:

I fully agree . . . as to the importance of the role of expectations of future prices in farmers’ supply response; not only the price of that single commodity, but the prices of alternative outputs, the factor costs of the alternative enterprises, and the alternative employment possibilities of the factors, including the operator himself. In brief, the comprehensive supply response study requires knowledge of the production functions underlying various enterprises, factor and product prices, and the conditions and rapidity with which farmers will react to seemingly more profitable production, as well as the ever present problem of technological change. (King 1956, p. 509)

Indeed the agenda set forth by King remains challenging and perhaps his recognition of these challenges explains his shift toward research on commodity demand when he joined UC Davis soon after publishing these remarks.

King also recognized many approaches to supply analysis in addition to time series econometrics. He explained that “this problem of trying to predict probable supply response has been tackled by various methods, such as budget analysis of modal-type farms, linear programming, and analyses of farm records, as well as by the analysis of time series data” (King 1956, pp. 509–510).

Also, in 1956, Giannini Foundation economists tackled econometric estimation of supply in a study by Yair Mundlak and Chester McCorkle (1956) on the supply of spring potatoes in California. They used econometric analysis rather than programming or other “normative” approaches because, as they stated, linear programming
“would tell the researcher what should be done for individual firm profit maximization, not what is done” (Mundlak and McCorkle 1956, p. 554). They noted that a combination of normative methods, estimation with survey data, and time-series analysis might be the best way to answer supply-response questions. They did not mention panel data or cross-section time series data, which would figure prominently in Mundlak’s work after he left California.

Mundlak and McCorkle did not focus on price expectations. They assumed that lagged price was a sufficient proxy for expected price and further assumed that this expected price was exogenous. They also did not attempt to deal with all of the subtle issues raised by King. They did place spring potato supply in a multicrop context along with alfalfa and cotton, which were the relevant alternative crops in the southern San Joaquin Valley, the region to which their analysis applied. They noted that spring potato acreage was determined by expected relative profitability with respect to alternatives and by total cultivated area in the region. Their estimated own-supply elasticity was approximately 2.4, large relative to the standard error. They also found that “the signs of the coefficients suggest a competing relationship between cotton and potatoes, and complementarity between alfalfa and potatoes” (Mundlak and McCorkle 1956, p. 562). The alfalfa estimate, in particular, was robust to alternative specifications and highly significant. Mundlak and McCorkle further commented on the positive relationship between the price of alfalfa and potato acreage but did not explain it with either farm management or agronomic evidence.

In the later 1950s, activity analysis—linear programming, input-output analysis, and related tools—figured prominently in the academic work on agricultural supply. McCorkle, Boles, and Faris were early adopters of activity analysis among Giannini Foundation economists. They used linear programming models for a variety of applications and described activity analysis’ applicability more broadly. McCorkle ended his 1955 methodological survey on the use of linear programming in farm management with the following prediction: “As wider use is made of linear programming in the analysis of farm management problems, more problems of sufficient complexity to preclude the simple computational procedures will become common. Further introductions of electronic computing equipment will offer additional opportunities to attack such problems. It is necessary, therefore, that a broader understanding be had of how these problems are adapted for different types of computing equipment” (McCorkle 1955, p. 1235).

In the late 1950s, Harold Carter and Gerald Dean joined the group of those regularly publishing their applications of programming methods and econometrics, among other tools, to commodity supply and farm management issues. This pattern of research has continued to the present day with contributions to both conceptual issues and practical questions of local importance.

To conclude this brief review of Giannini Foundation research on agricultural supply and related questions, let us consider a fundamental long-run issue facing agricultural supply. Although mainly known for work on marketing and economic organization, R.G. Bressler devoted his 1958 American Farm Economics Association presidential address to “The Impact of Science on Agriculture.” He noted the rapid productivity growth in agriculture and focused on research and development as a
production activity and capital investment. (He observed in passing that only 4% of federal funding for agricultural research was devoted to social sciences.) Bressler did not provide estimates of rates of return to research nor of productivity growth or measures of the linkage from research and development to productivity growth. (Nor did he cite the work of Griliches or Schultz, with whom we now associate early work on the economics of agricultural research and development.) He did, however, consider investments in productivity-enhancing research in the context of the agricultural “surpluses” with which government programs had been dealing throughout the 1950s. Bressler argued that curtailment of agricultural research and development should not be the policy instrument chosen even if government-set supply controls were applied. He provided a number of compelling reasons for the position, mainly concerning the uncertainty and long time horizon associated with research impacts on productivity, and few economists would disagree with his conclusions.

**Giannini Foundation Studies on Commodity Situation and Outlook, Farm Production, and Farm Management**

An early feature of Giannini Foundation work was preparing situation and outlook reports and sometimes simply publishing economic data series for California farm commodities. Most of the first two dozen papers and reports of the Foundation dealt with commodity situations and outlooks. In Foundation paper 12, which was subsequently published in the *Journal of Farm Economics*, H.R. Tolley (1930) outlined the role of local versus national outlook research. He began: “The purpose of outlook reports, national, state or local, any of us would say, is to make available to farmers information which they can use as a guide in planning their production and marketing programs.” He went on to consider the information demands: “What information do farmers in a particular area or locality need in order to do their planning most intelligently? The answer that most of us economists would give at first thought is: Information that will make it possible to form an intelligent judgment as to prices that may be expected at marketing time for the commodities to be produced” (Tolley 1930, p. 588).

Tolley went on to distinguish between outlook work of national relevance, which would naturally be done at the federal level, and local outlook work that would naturally be done at the state or regional level. He also considered the use of outlook reports in farm management and budgets. He noted that there is sufficient information to prepare budgets in agriculture and stated that “recently the manager of a farming corporation in California producing something like a million dollars worth of commodities annually, mostly fruits and vegetables, told me he has been making an annual budget each year since 1922, and that with the exception of 1929, when a severe freeze curtailed his production very seriously, the estimates of income made at the beginning of the year have been within 5% of the actual income” (Tolley 1930, p. 594). This is a remarkable claim and few California growers of fruits and vegetables would make such a statement today.

The tradition of regular, systematic, and routine reporting on local situations and local outlooks for the hundreds of California commodities faded gradually. In the United States, such outlook studies are now mainly the province of USDA for products of national importance and private industry analysts for other products and
specific locales. A partial exception is the baseline studies of the Food and Agricultural Policy Research Institute (FAPRI), which is based at Iowa State University and the University of Missouri. FAPRI provides ten-year projections that assume constant policies and are used mostly for simulations of the impact of alternative policy measures. In part because hay, fruit, vegetable, and tree nut crops are not subject to large national subsidy programs, neither USDA nor FAPRI provides much routine outlook analysis for these crops. Rather than preparing outlook studies, Giannini Foundation economists shifted relatively soon to periodic, intensive studies of issues facing California commodity industries. These periodic studies, including some that estimate supply and demand functions and consider policy options or the impacts of trade, have required some description of the market situation and outlook as background but outlook is not the main purpose.

Preparation of reports on commodity costs of production continued for about twenty years and, after a hiatus, has been reinvigorated in the past thirty years, although it is now considered more of an outreach activity than a research activity. These studies, now available on the UC Davis Department of Agricultural and Resource Economics website, are based on historical experience and do not use forecasts of input or output prices. Thus, they must be supplemented by farmers’ own estimates to be helpful as decision aids. Nonetheless, the studies are probably among the Foundation’s most used outputs in terms of commercial agriculture in California.

Farm management is another area of early effort that gradually received substantially less emphasis over the years. L.W. Fluharty was a regular contributor of early papers on “Enterprise Efficiency Studies on California Farms” and related topics. R.L. Adams, who was trained as an engineer, wrote often in the 1930s and 1940s on management of large farms, farm machinery issues, and general topics in farm management and organization. Size economies and issues in large-scale versus family farms were regular themes that have been recurring issues for the Foundation ever since. Farm land tenancy and farm credit issues were closely aligned to farm management, as were studies on land and water, especially in those early years before resource issues were considered a part of environmental and resource economics.

CONCLUSIONS
This paper has compiled and categorized Giannini Foundation publications and dissertations and reviewed some important research related to agricultural supply from the first half of the history of the Foundation. This analysis indicates patterns and trends and documents insightful path-breaking research contributions by the Foundation. However, it does not review all 10,000 member publications nor determine which publications are the most important. It would surely be educational to skim through a few hundred candidates and select the top dozen that made the most remarkable contributions. The real fun would be finding and learning from the hidden gems that did not win awards or receive many academic citations but that nonetheless reward closer study. While a few interesting Foundation research contributions have been discussed, there are several hundred more that are probably just as interesting. The strategy here for finding gems was to devote attention to the 1930s
through the 1950s and leave aside the recent work with which many economists are already much more familiar.

This paper also did not discuss in detail the major agricultural supply issues or problems that have faced California agriculture over the past seventy-five years. A few major trends are listed—growth in the importance of irrigation, the shift in production from Southern California to the San Joaquin Valley, the growth and then decline in cotton and grain acres, the reversal of fortune between the grape and orange industries, and the growth in importance of tree nuts. But the key economic problems that drove those trends and how farmers have coped with other challenges to production agriculture in California are not outlined. Giannini Foundation research topics have reflected these important supply issues but it is too much to claim that Foundation research has provided solutions.

It was beyond the scope of this paper to analyze how California agriculture has been affected by the research on agricultural production and supply conducted by members of the Giannini Foundation. The fundamental question is whether the research in this topic area has had an impact. And without a response to this preliminary question, it is not possible to investigate the payoff or rate of return to the Foundation investment. For many years, economists have attempted to measure rates of return to investment and there is a large industry associated with calculating rates of return to research. Giannini Foundation colleagues are experts in that field and I urge them to conduct the research on research that is called for. This paper can simply conclude with a citation to George Stigler’s (1976) delightful paper, “Do Economists Matter?” Stigler answers his question affirmatively and even quantitatively (with reference to a calculation attributed to Coase). I have spent many years avoiding disagreement with Professor Stigler or Professor Coase and will not start now.

NOTES

1. The Giannini Foundation provided partial support for the research effort of University of California agricultural and resource economists. A greater share of the total budget came from state and federal funds. The calculation was simply to sum the number of Giannini-Foundation-affiliated faculty members each year for the seventy-five-year period. This does not count graduate students or research associates.

2. To make the criteria more clear, let us consider a few recent examples of dissertations that were or were not included in the list of those dealing with California agriculture. Included is John Crespi’s dissertation, “Generic Commodity Promotion and Product Differentiation” (2000). There is no mention of California or a specific commodity in the title but the topic is clearly of importance to agriculture in California. Included is Sadi Grimm’s dissertation, “Estimation of Water and Nitrogen Crop Response Functions: A Factor Nonsubstitution Model Approach” (1986). Again, there was no specific mention of an application to California and perhaps the dissertation was purely methodological but the issue is of clear relevance. Patricia Boyland’s dissertation, “Effects of Tractorization in Rice Culture in the Philippines” (1989), was not included because the application is specific to economic development and any connection with the economics of California agriculture seemed tangential. Similarly, Yurie Tanimichi’s dissertation, “Essays on the Economic Analysis of Transboundary Air Pollution” (2002), was not included. Here there is no indication of any application to California agriculture and the application seemed more likely to air pollution in general. Amos Golan’s dissertation, “A Discrete-Stochastic Model of Economic Production and a Model of Production Fluctuations—Theory and Empirical Evidence” (1988), seemed to be more methodological than oriented to an application to
California agriculture. Had efforts been expanded to reading abstracts, these excluded dissertations might have been found to have closer connections to California agriculture than is evident from the titles.

3. Figure 7 includes data from 1950 forward because there were only six dissertations prior to 1950 that had an identifiable commodity focus. Of those six, one dealt with dairy, one with tomatoes, and the others with tree crops, including oranges, plums, almonds, and peaches. Several of the other dissertations dealt with fruit and tree nut or horticultural crop issues without specifying a commodity in the title. And one dissertation that was not commodity-specific, Varden Fuller’s famous 1939 dissertation on hired farm labor, was clearly devoted to California agriculture.

4. By “routine” I do not mean easy. Indeed, one reason that such work is not popular among researchers is because it is so difficult and, unlike other research we undertake, it is often soon evident when our forecasts prove inaccurate.

REFERENCES


The Giannini Foundation and the Welfare of California Agriculturists in a Changing State, Nation, and World

Gordon C. Rausser

The assignment for this paper and the associated presentation at the Giannini Foundation 75th Anniversary Symposium was to assess the Giannini Foundation’s contributions to one of the mandates specified in its original mission, namely to evaluate “the relations between conditions existing in the farming industry and the general economic conditions prevailing in the nation and internationally,” or, as the organizers for the conference noted, “California farmers in a global context” focusing on the welfare of California agriculturalists. There is little doubt that, when A.P. Giannini established the Giannini Foundation in 1928, he sought to improve the welfare of California agriculturalists. In keeping with his charge, over the past seventy-five years Giannini Foundation members have focused on real-world problems, analyzing and designing policies and programs that manage the response to positive as well as negative external events. Giannini Foundation researchers have measured and helped California agriculturalists address positive external effects in market structure (e.g., improvements in commercial growth and profitability) as well as negative external effects (e.g., environmental externalities related to pesticides, water, air quality, and waste disposal). Significantly, A.P. Giannini anticipated the extension of agricultural economics and the welfare implications of resource scarcity, especially the competition for land and water. A.P. Giannini’s insight about the future of agricultural economics heralded the path of the field’s expansion; over the years the Berkeley and Davis departments changed their names from Agricultural Economics to Agricultural and Resource Economics, incorporating faculty members with expertise in such fields, inter alia, as environmental economics, economic development, international trade, and public policy.

In addition to being a forward thinker, A.P. Giannini was also a generous man. Development of a Department of Agricultural and Resource Economics at UC Berkeley and later at UC Davis reflects the generosity and tradition of both the Giannini Foundation and the land grant university in California. A quote from John Kenneth Galbraith, a Ph.D. student from the Berkeley department and an instructor at the university’s College of Agriculture campus at Davis, aptly portrays the culture that existed shortly after A.P. Giannini’s gift:1

At Berkeley I suddenly encountered professors who knew their subject and, paradoxically, invited debate on what they knew. They also had time to talk at length with graduate students and even come up to the International House to continue the conversation. I first discovered at Berkeley—from Henry Erdman, who had until recently
been the head of the agricultural economics department, and Howard Tolley—that a professor might like to be informed on some subject by a graduate student. And that he would be not just polite but pleased. So profound was that impression that I never stopped informing people thereafter.

This early spirit of mentorship and intellectual flexibility has served the Giannini Foundation well, as we shall see. The Departments of Agricultural and Resource Economics (ARE) at UC Berkeley and UC Davis now rank in the top three in the world, not just in the United States. Furthermore, while the other top-ranked department, University of Maryland, achieved its status through extraordinary faculty compensation, frequently to faculty members holding a Ph.D. from one of the UC departments, the UC Berkeley and Davis ARE departments achieved their rankings through embracing the Giannini tradition of solving important, real-world problems.

After briefly discussing what distinguishes the origins of agricultural economics from other fields of economics, the paper presents examples of research by Giannini Foundation members who anticipated or responded to a series of watershed events affecting California agriculturalists over the past seventy-five years. With these key historical episodes in mind, the paper assesses how the immense intellectual capital of the Giannini Foundation today will play an integral role in shaping the future of California agriculture for many decades to come.

**Distinguishing Characteristics of Agricultural Economics**

From its origins, agricultural economics, in contrast to many other fields of economics, formed its analytical lens as part of a larger, coordinated social-natural system emphasizing the integration of economics and basic science. Agricultural economic research has generally sought to answer real-world questions and to emphasize testing economic theory against the available evidence. Combining the insights of the economic discipline with the practical and scientific knowledge of agriculture allowed the Giannini Foundation during its first twenty years to distinguish itself among its land grant university competitors. The agricultural economics approach may be summarized in terms of the following types of questions: Since markets aren’t perfect, what are the effects of identified imperfections? Which imperfections are important? How might they be mitigated or eliminated? In pursuit of answers to these questions, agricultural economics has contributed to econometrics and economic theory and has furthered our understanding of how markets and economic actors actually operate as opposed to how they are presumed to operate in theory.

In essence, agricultural economic contributions have been heavily influenced by the discipline’s research culture and, as a result, by fundamental methodology. In addition to the two distinguishing characteristics previously noted that tend to differentiate agricultural economics’ analytical frameworks from economics as a whole (namely, the tendency to view economics and economic analysis as part of a larger, coordinated, social-natural system and an emphasis on integrating economic and scientific modeling), three other factors are important: (1) the emphasis on the importance of time and space for understanding economic phenomena; (2) the emphasis on identifying the flexibility or inflexibility of factors of production and economic agents; and (3) the emphasis on the importance of institutions.
Historically, these crucial distinguishing characteristics can be partially traced back to the pragmatic land grant university tradition of agricultural economics research at the University of California. Much of the early success is largely due to contributions by Giannini Foundation members who were among the first to apply statistical and econometric methodology to facts originating from market outcomes and institutions, along with basic science. Perhaps most importantly, Giannini Foundation agricultural economics contributions focused on relevance to those outside the economics profession, especially the direct and indirect users of economic analysis.

**HISTORICAL WATERSHED EVENTS**

To structure a sweeping overview of the last seventy-five years, our committee selected eleven watershed events and assessed how research by Giannini Foundation members added value to California agriculturalists before, during, or after these significant occurrences. Our lens for these watershed events, of course, historically follows the 1928 establishment of the Giannini Foundation.

**THE GREAT DEPRESSION**

Financial problems in California agriculture preceded the Great Depression of the 1930s. As the president of the Bank of Italy, which loaned fully half of its funds to agriculture by the 1920s and faced significant exposure to the agricultural crisis, A.P. Giannini was in a good position to appreciate these risks. In the 1920s, a 43% increase in California acreage devoted to fruit and vegetable crops coincided with a dramatic decline in acreage allocated to field crops. Prices of fruits and vegetables fell during the late 1920s, plunging many farmers into financial difficulty. These financial problems increased during the Depression years, a period when 20% of the state’s population relied on some form of public assistance. By the early 1930s, California farm income had fallen by 50% since 1925. By 1934, more than 4% of California farms were in default or under involuntary sale. Surprisingly, the number of farms continued to climb during the early 1930s, as many small farmers entered the sector. In 1935, there were 150,000 farms, the largest number in California history. However, with increased defaults the number of farms began falling and a wave of consolidation began.

Beginning in the late 1920s, California experienced one of its periodic droughts lasting through the early years of the Depression. California farmers responded by pumping more ground water, thus increasing pressure on limited supplies. Irrigation was already widely used in California, but the irrigation projects were scattered and not coordinated. Water shortages led to an intensification of efforts to develop a state plan to store and transport water from the north and west to inland valleys. In 1933, the state legislature authorized the Central Valley Project but was unable to secure financing. The project was finally adopted by the U.S. Bureau of Reclamation as a public works project and construction began in 1937. As a later Giannini Foundation director remembered, “Much work has been done by engineers and geophysicists on ground water. But the economic and social aspects have been neglected or have been dealt with inadequately.” Foundation researchers thus appraised the physical, economic, social, and legal aspects of ground water, assessing such regional ground
water basins as the Santa Clara Valley, the South Coastal Basin, and the southern San Joaquin Valley.

Prior to the Depression there had been little labor unrest in California. The few exceptions included a riot in 1913 when the International Workers of the World (the “Wobblies”) attempted to organize hop pickers and in 1928 when Mexican workers in the Imperial Valley struck for higher wages. Labor unrest became endemic during the Depression. In 1934, a general strike precipitated by longshoremen closed down San Francisco. Agricultural workers attempted to unionize and held strikes but were countered by growers who joined forces as Associated Farmers.

In response to complaints, a federal commission found that in some cases worker rights had been violated. Governor Young then appointed an independent investigating commission that included prominent UC officials such as the dean of the College of Agriculture and the Giannini Foundation’s first director, Claude B. Hutchison. This commission emphasized the role of communist agitators in the labor unrest and published its findings, drawing criticism from the California Department of Commerce and other groups. In response to this criticism, President Robert Gordon Sproul stated that Hutchison was serving as an “interested individual,” not as a representative of the University of California.

During the remainder of the Depression, the College of Agriculture kept a low profile in rural labor issues. A 1939 senate committee determined that agricultural worker rights to organize had been violated, but the labor question dissipated with the onset of the war. Yet, also in 1939, Levi Varden Fuller wrote an extraordinarily insightful dissertation at UC Berkeley looking at the welfare of California agriculturists as a result of the events that took place during the Great Depression entitled “The Supply of Agricultural Labor as a Factor in the Evolution of Farm Organization in California.” This was one of the earliest empirical studies of agricultural labor that demonstrated the importance of a supply of cheap (often immigrant) labor to the agricultural sector.

Throughout the Depression, Giannini Foundation appointments strengthened the Department of Agricultural and Resource Economic’s quantitative analytical approach that had begun with Henry Erdman and Harry Wellman, who regarded economic theory and quantitative analysis as basic tools for applied work in agricultural economics. Key hires included George Peterson, who taught production economics and statistics along with Howard Tolley, a mathematician hired from the USDA. Along with James Tinley (who specialized in dairy marketing), Sidney Hoos (who studied commodity economics and price analysis), Carl Alsberg, and George Kuznets, these early Foundation members helped facilitate a major change in agricultural economics research by applying statistical procedures for data analysis. This new econometric approach was applied to a range of topics, including studies on milk marketing, cooperative organizational structures, land economics, and the conservation of natural resources. In the long term, the skills practiced and taught by the early generation of Giannini Foundation members have paid huge dividends to California agriculturalists as UC-trained graduates and professors built up enormous intellectual capital through the post-World-War-II era. The most direct response to the Depression, however, was by Wellman and Tolley, both of whom temporarily left Berkeley in the
mid-1930s to work for the Agricultural Adjustment Administration and helped to craft the Roosevelt administration's implementation of the early New Deal agricultural programs.

WORLD WAR II

Without question, a second watershed event over the last seventy-five years was the economic disruption that took place during World War II. The disruption caused food and labor shortages throughout the United States, necessitating research on price control and self-sufficiency. Even before Pearl Harbor, Hoos, Wellman, and others in the Foundation had worked on quantifying the demand effects for California products so they were well-positioned to provide expert counsel. In 1942, Tinley and Erdman began to seriously examine price control prospects and the relevance of pre-existing interventions using World War I as a guide. Wellman worked with the War Food Administration and the Office of Price Administration on price ceilings for fruits and vegetables, Benedict and Hoos joined war-related federal departments, and Tolley became the director of the Bureau of Agricultural Economics. But perhaps the most lasting legacy of the Foundation on the war-time issue of price controls was by John Kenneth Galbraith.

While never formally a member of the Foundation, Galbraith credited his time at both Berkeley and Davis with the basic themes and ideas behind his extraordinary books, *American Capitalism: The Concept of Countervailing Power* (1952) and *The Affluent Society* (1958) and his war-time management of the Office of Price Administration (OPA). His unprecedented, comprehensive price interventions as deputy head of the OPA met with unanticipated success, contradicting prewar economic consensus that such interventions were “unwise and impossible.” There was effective control without rationing and inflation was held at bay for several years. His insights on the relevance of market structure include the concept that “modern markets lend themselves to price regulation to a far greater extent than had previously been supposed.” He characterized the prevalence of markets with few sellers as experienced at fixing prices, coining the phrase “It is relatively easy to fix prices that are already fixed.” His strategic insight on decentralized enforcement revealed that competitive customers naturally coordinate their influence to police price control of oligopolies on the sell side of the market and vice versa. These insights drew significantly from his agricultural economics training and his intellectual relationship with Giannini Foundation members.

Galbraith based *American Capitalism: The Concept of Countervailing Power* on the formation of cooperatives trying to rebalance the concentration that existed on the buy side of a number of commodity markets for crops produced in California and the marketing order experience for fresh fruits and vegetables. He generalized this experience in the hypothesis underlying his book on countervailing power and it also became a core theme in *The Affluent Society*. After he finished as head of OPA, Galbraith made a wonderful comment about a book he wrote on price controls. He said he believed it was the best piece of work he had ever done but that none of his fellow economists read the book. As a result, he decided “to hell with them.” He would start writing for the intelligent layperson and the first result was *The Affluent Society*, one of the most widely influential works of economics in the twentieth.
century. Here, as with much of Giannini Foundation agricultural economics research, the focus was also on direct and indirect users of economic analysis.

**INTERSTATE COMPETITION**

Turning to the decade of the 1950s, competition intensified among various states involved in supplying the major metropolitan eastern markets. This was especially true in the markets for fresh fruits and vegetables. As the competition from other western states, southeastern states, and various geographic locations within the Midwest accelerated, Foundation members assisted California agriculturalists with timely research. Giannini Foundation researchers provided practical advice and counsel on establishing a competitive advantage for California producers in their pursuit of growing markets. From the 1950s through the mid-1960s, the increase in interstate competition in the agricultural product and food sectors prompted Giannini Foundation members to study food packing and processing efficiencies, leading to development of several important operational models focused on spatial equilibrium, plant location, and optimal raw product assembly. Increasing interstate competition also prompted Giannini Foundation researchers to analyze the optimal distribution of California food products (form, time, and space) under unregulated and regulated conditions.

During this period, Foundation members contributed most significantly by integrating economics and engineering science through the application of time and motion studies. Work by professors Ben French, Loy Sammet, and Ray Bressler on time and motion and the inclusion of time in production and cost functions anticipated a later development by Nobel Prize winner Gary Becker on the theory of time allocation.

Giannini Foundation members also contributed a huge amount of work on spatial equilibrium models that focused on positioning California to compete with other agricultural producing states. They also did significant work on plant location models to determine the optimal location given the trade-off of balancing the cost of distribution with the cost of raw product assembly. Both at Berkeley and at Davis, Giannini Foundation researchers worked on the optimal distribution of California food products. At the end of this period, economists within the Foundation started measuring demand elasticities and the implications of such measures on pricing and the welfare of California agriculturists. The econometric focus of Giannini Foundation members was especially useful in estimating differences in elasticities between different time periods and across space, as well as how agriculturists in California should allocate available supply to maximize commercial profits.

**THE BRACERO PROGRAM AND TOMATO HARVESTING**

Given the current active debate on Mexican immigration to the United States, the Bracero Program is a historical watershed event with particular contemporary relevance. As the labor-intensive fruit and vegetable sectors in California agriculture grew during the 1920s and 1930s, so did the importance of migrant labor. When it became clear that U.S. involvement in World War II would lead to domestic labor shortages, the United States and Mexico negotiated the Bracero (farm hand) Program
to bring in temporary immigrants to work in the agricultural sector. After the war, agricultural interests succeeded in obtaining repeated extensions of the program until President Johnson ended it in 1965. Throughout its existence, however, opposition to the program grew from people who claimed that the migrants forced down agricultural wages for U.S. citizens and increased rural poverty.

In particular, University of California agricultural economists were central in analyzing the impact of the role of migrants in the agricultural labor pool in the processing tomato industry, where the end of the Bracero Program threatened the labor-intensive harvesting. Representatives of tomato farmers claimed that the loss of reasonably priced and available workers would cause the processing tomato industry to move to Mexico where there was no shortage of labor. Instead of disappearing, the value of the industry grew as mechanical tomato harvesters began to replace manual labor. Tomato harvesters had been under development at the University of California for twenty years, but the state legislature allocated money to speed up this research in anticipation of the end of the Bracero Program. The technology was introduced shortly before the program ended; by the end of the decade, 100% of the tomato harvest was mechanical.

The substitution of capital for labor precipitated by the loss of cheap labor has occurred throughout the history of agriculture (and in many other sectors), but seldom has it been as abrupt and obvious as in the case of the tomato harvester and the Bracero Program. The change had profound social effects. The tomato industry thrived but employment fell by nearly 50%. Many tomato farmers, unable to afford the expensive technology, left the sector; the number of tomato farmers dropped to less than 25% of the level in the late 1950s.

The experience with the tomato harvester was expected to usher in a wave of mechanization. However, cheap labor remained plentiful and the costs of mechanization were larger than anticipated. Total employment in agriculture remained stable during the 1960s and increased during the 1990s. This stability resulted from a shift from family labor to hired labor, an increased demand for (and production of) fruits and vegetables, and the reorganization of processing.

Social activists claimed that state support (via UC research) of the tomato harvesting technology handed a windfall to tomato farmers at a great cost to farmworkers and rural communities. Giannini Foundation economists emphasized that this state-funded research had generated an enormous economic return. However, they also recognized that private cost-benefit analysis neglects social costs, particularly those arising from a short-term adjustment of displaced and subsequently unemployed labor.

The fact that the university had financed the research led to more than a decade of litigation over the issue of whether the expenditure of Hatch Act monies required taking into account the likely social consequences of the supported research. On appeal, the state Supreme Court ruled that it was not practical to determine the effect of university-sponsored research ex ante and that it would be an infringement of academic freedom to require that research be vetted for its social consequences.

Although the judicial decision was unambiguous, it was followed by many years of public controversy. This controversy continues today as questions about
public-private partnerships become increasingly important in university research. One of the effects of this controversy is the wide acknowledgment of the public’s legitimate interest in university research. Public interest in university research may seem self-evident but actually represents a major shift in perception. During the first sixty years of the twentieth century, the general consensus was that increases in agricultural productivity made possible by university research automatically contributed to the public good. The advent of the tomato harvester and other technological developments made it evident that “progress” creates winners and losers. Two Giannini Foundation professors wrote one of the best empirical papers ever published on welfare analysis, examining the effects of the tomato harvester and plant breeding innovation on producer welfare, consumer welfare, and social costs resulting from displaced labor—“Mechanized Agriculture and Social Welfare: The Case of the Tomato Harvester.” Identifying the distribution of gains and losses is an increasingly important part of the social and economic research undertaken by the Giannini Foundation.

The Rise of the United Farm Workers

The social activism behind the political decision to terminate the Bracero Program and the concomitant technological developments that weakened labor’s bargaining power were important parts of the social environment that nurtured the United Farm Workers (UFW). This union, formed by Cesar Chavez and Dolores Huerta, began as a worker-rights organization to enable workers to collect unemployment insurance. After a well-publicized five-year boycott of table grapes that led to union recognition by most major growers and a 40% increase in wages, the UFW went on to organize workers in lettuce fields in Salinas and the Imperial Valley and orange groves in Florida.

The Teamsters challenged UFW domination by signing contracts with orange growers that had previously dealt with the UFW. In response, the UFW conducted strikes and secondary boycotts. In an effort to eliminate increasing violence that had led to several deaths, the state passed farm labor legislation requiring that employers bargain with the union selected by workers. This legislation also created the Agricultural Labor Relations Board, which was modeled on the National Labor Relations Board.

During the rise of the UFW and its conflict with the Teamsters, Giannini Foundation members did a number of labor productivity studies on California agriculture. They analyzed migrant labor contributions to the agricultural sector and the relative poverty levels of migrant versus domestic laborers. Foundation researchers also analyzed the effect of legal migrants and the role of the UFW on various socio-economic status measures, including housing, wages, and other forms of compensation. Finally, they conducted a number of studies sponsored by the governor’s office on the welfare of California agricultural labor. A review reveals that there were many Giannini Foundation members who were not only actively engaged in designing the mission statement for the studies but were also doing much of the analysis that informed the California legislature and the governor’s office.
The California Water Plan and Federal Projects

In California resource economics, management of water and water rights that commenced with the California Water Plan has been of fundamental importance. There is no question that water rights, allocations, and supporting institutions have a material impact on the welfare of California agriculturalists. Initially, plans for water carriers were introduced throughout the first half of the twentieth century in the California Water Plan. Members of the Giannini Foundation contributed to the evaluation and design of financial contracts of these state projects. They also provided the economic rationale for conjunctive use of ground and surface water to overcome droughts and instability. Moreover, they introduced pricing and trading schemes that made it possible to capture more value from existing water resources—studies that were viewed as irrelevant at the time but proved valuable later. Among the most significant of these contributions was the first major theoretical and empirical application of conjunctive water use, namely, the joint management of both conjunctive and surface water done by a Ph.D. student at UC Berkeley who was subsequently hired on the faculty of UC Davis.

Over the years, a number of crisis events and institutional changes have emerged from California water resource systems, including the Kesterson Wildlife Refuge, the drainage crisis, water banks, and the CVPIA (Central Valley Project Improvement Act). In 1985, there was a major drainage problem in California that could not be resolved by the creation of a wetland. Access to federal water was threatened if solutions were not introduced but the initial proposals were capital intensive and simply too expensive. The crisis came about very quickly and was a total surprise to California agriculturalists and all other interested parties. In response, Giannini Foundation economists looked at restructuring the kinds of incentives that existed for conservation, changes in land use, and, moreover, implementation of the fundamental notion of option value and the flexibility to wait before making commitments on capital investments. Specifically, Foundation economists proposed a management solution that included incentives for conservation, changes in land use, and evaporation. This research allowed policy-makers additional time to select superior solutions. Subsequently, environmental interests pressured the CVPIA to divert water from agriculture to the environment. Giannini Foundation research showed that the costs of diversions would be much smaller if they were combined with water trading, a key component of the CVPIA-motivated Giannini Foundation research. Members of the Foundation helped establish an electronic water system, a mechanism that allowed increased efficiency and water security. More recent Giannini Foundation research has focused on the welfare consequences of reallocating water among urban, agricultural, and environmental uses, particularly the San Diego – Imperial Valley water-transfer transaction.

Establishment of the Environmental Protection Agency

Another major event was establishment of the Environmental Protection Agency (EPA). In the early 1970s when the EPA was organized, the agency’s founders looked around the country to find the expertise to deal with spatial pollution, air pollution, and land and ground water pollution and found that agricultural economists were the best equipped to address these critical externality questions. Moreover, a review of all
the major grants given by the EPA to academic researchers during the agency’s early years would find that almost all were held by people with formal training in agricultural economics.

The best work on pesticide externalities in the world has been done by Giannini Foundation members. Furthermore, all the work on contingent valuation to determine how society values such resources as Yosemite National Park or Lake Tahoe remaining pristine emerged from some conceptual lenses that were developed long ago by a Giannini Foundation faculty member. These are a number of people who were or currently are at the Giannini Foundation who are intellectual leaders in applying these basic concepts of contingent valuation to determine a particular population’s willingness to pay.

The Giannini Foundation also contributed to environmental economics with work on environmental preservation, uncertainty, and irreversibility and on positive quadratic programming, a widely used tool for assessment of the impacts of water and climate change policies. More importantly, Foundation members do not typically accept the conventional wisdom that trade-offs exist between environmental quality and economic growth but rather search for the complementarities that might exist and what institutional governance structures might be required to capture such complementarities.

The Giannini Foundation also conducted breakthrough research on pest control, including (a) the introduction of modern integrated pest management (IPM) and biological control; (b) the use of modern economics to evaluate health risk and trade-offs with agricultural productivity; and (c) pesticides as damage-control agents, their potential human health effects, and their substitutability with transgenic seeds. When the “Big Green” pesticide ban proposal was discussed by legislators in 1991, Giannini Foundation members conducted a study that showed that it would negatively affect low-income consumers. As a result, Giannini Foundation members offered remedies, including taxation and pollution regulations. The general public supported these alternative remedies by rejecting “Big Green” initiative at the polls.

With respect to the proposed phase-out and ban of methyl-bromide, Foundation researchers showed how a total ban would be costly and counter-productive since scaling back to 25% of historical use would preserve 80% of the benefits. In the case of invasive species and plant diseases, Foundation research demonstrated how medflies, Pierce’s disease, and white flies may cost billions in damages and how distributional effects are more significant than the aggregate impact. Once again, Foundation researchers have offered practical solutions emphasizing the use of monitoring, prevention, and rapid and targeted responses rather than heavy-handed public policies.

FARM FINANCIAL CRISIS

The farm financial crisis of the 1980s began in the Midwest but slowly made its way to California, affecting U.S. agriculture as a whole. Giannini Foundation researchers demonstrated that the major causal forces underlying this financial crisis were sourced with monetary policy, federal fiscal policy, trade flow, and exchange rates. In essence, the monetary policy of the Federal Reserve in the early 1980s forced interest
rates and the relative value of the U.S. dollar to overshoot. The latter phenomenon reduced the export market for agricultural products across the United States, including California, and helped contribute to a dramatic downward spiral in commodity prices. These causal phenomena were almost a complete reversal of what took place over much of the 1970s. The rapid expansion in available debt capital to agriculturalists in the 1970s was asset-collateralization-based. Hence, as inflation began to recede and export markets turned upside down, the market value of underlying collateralized assets fell dramatically. Debt-service-based finance was relatively uncommon compared to the asset-based financing that took place during much of the 1970s. As a result, the agricultural sector throughout the United States was indeed vulnerable to the effect of reversal of external factors (trade, monetary policy, exchange rates, interest rates) on final market pricing traced all the way upstream to input pricing, particularly land prices.

Although A.P. Giannini had earlier advised that “we should look the other way” when facing temporary displacements or the inability to service loans, approximately two million acres of land defaulted to Bank of America during this period. The crisis was much worse in the rest of the United States, in part because major external events fostered imbalances in the early 1970s, such as rampant inflation when prices for commodities such as soybeans were temporarily at $13 a bushel. Moreover, there were rapid increases in the price of energy. Such imbalances reversed course in the early 1980s and the pendulum swung dramatically, resulting in a real recession in the agricultural sector throughout the United States.

Giannini Foundation members helped to explain this phenomenon when a number of econometric models were at sea with regard to trying to explain the major price bubbles that were taking place in the early 1970s. Foundation members were able to explain the difference between the 1970s and 1980s and the implications for the farm financial crisis of the mid-1980s. This crisis resulted in a bankrupt farm credit system that was resolved by a government bailout. Foundation members helped design the bailout to achieve sustainability and avoid moral hazard.

Along similar lines, during the design of decoupled policies and compensation of growers for policy reform in the 1990s, as well as planting flexibility in the late 1980s and the related protection of California growers (motivated by political forces), Giannini Foundation members played integral roles when such decisions were being made at the federal level. In fact, they served on executive working group committees charged with the responsibility to design and implement these public policies affecting the welfare of California and other state agriculturalists.

**Bayh-Dole Act and the Establishment of Private Intellectual Property**

At the beginning of the genetic engineering era, the Bayh-Dole Act gave universities the rights to any discoveries financed by federal grants (1980). Intellectual property rights (IPR) covered new life forms and patents for plants during this period of growing private spending and stagnant public spending on agricultural research and development. At the end of the day, the Bayh-Dole Act is about intellectual property rights and how universities have slowly been pulled into the commercial sector. The act assigns property rights to research discoveries and their commercial value, if any,
accrues to universities. Universities are generally not in this business of capturing, let alone understanding, commercial value. Nevertheless, there were given incentives to search for opportunities to capture the commercial value of the research discoveries that resulted from their scientists’ research. This has led to numerous university/private research partnerships that Foundation members have helped to design. Moreover, Foundation members have been actively involved in structuring patent pooling arrangements to facilitate access by both the private and the public sector.

The landscape for agricultural production at the time of the Bayh-Dole Act was much different than it is today. In the case of agricultural inputs, Foundation members have explained the forces influencing industry consolidation, the evolving market structure, and the role of university technology transfer offices. Thus, Foundation research has made the new reality transparent and assisted in navigating new innovations by analyzing the growing industrial-educational complex. Foundation members took part in the evolution of agricultural research by assessing the emerging agricultural information sector and identifying when the use of each type of IPR is preferred, i.e., patent, prize, or trade secret. The Foundation designed mechanisms to access IPR for breeders of crops underserved by the private sector, such as specialty crops in California and crops grown by the poor in developing countries. Foundation researchers have also proposed IPR licensing to enhance innovation and availability of drugs for the poor.

THE GREEN REVOLUTION

From the 1970s through the 1990s, the Green Revolution and subsequent increase in productivity in developing countries provided the opportunity to evaluate income versus substitution effects on the global demand for agricultural products produced in California. The indirect effects of the Green Revolution, marked by a notable increase in food production in the Third World because of improved strains of maize, wheat, and rice, not only helped prevent large-scale famine but also made the fundamental study of substitution and income effects possible. The economists of the Giannini Foundation have been actively engaged in demonstrating to California agriculturalists the benefits they derive from the growth of the developing agricultural sectors in developing countries because of income effects. To be sure, there may be competitive suffering in the short run due to substitution effects. For example, Chile and Mexico have become more effective competitors for a number of different products sourced in California, but in the long run there are major benefits to be had by California agriculturalists as a result of economic growth in these countries.

The Green Revolution was orchestrated in part by the Consultative Group on International Agricultural Research (CGIAR). Various Giannini Foundation members have been actively engaged in the work of CGIAR and the various research institutions that comprise this global institution, serving on its board and as its chair. Perhaps more important, however, are the studies and analyses that have been conducted to analyze the economic consequences of new research discoveries and increase productivity of a number of basic crops. For California agriculturalists, much of this research has implications for the short-run substitution effects vs. the long-run income effects on export demand for California’s higher-quality food products. Of recent interest is the
Giannini Foundation analysis of private sector discoveries vs. nonprofit public-good research initiatives and discoveries.

TRADE LIBERALIZATION AND THE GLOBALIZATION OF MARKETS

There has been a large amount of research work done on trade liberalization by Giannini Foundation members. The GATT-Uruguay round that engaged and brought agriculture into trade negotiations was kicked off in 1986. Giannini Foundation members were at that meeting in Punta del Este when the process began. The focus of this research has been on who wins, who loses, and what the environmental consequences might be from trade liberalization and/or globalization. This research includes an evaluation of the GATT-Uruguay round, the North American Free Trade Agreement (NAFTA), and the Doha World Trade Organization (WTO) round; assessment of effects of California being the nation’s largest exporter of agricultural products; income growth, especially in the Pacific Rim, driving an increased demand for higher-quality food and fiber; international agreements opening more foreign markets to California exports; better access of foreign products to U.S. markets due to the fall in U.S. import barriers; improved assessment of technical trade barriers that must be based on scientific evidence; and investments by multinational firms and joint ventures in highly processed products that are changing the form and shape of agricultural trade.

The Giannini Foundation is uniquely well-equipped to formally evaluate the impacts of trade liberalization and globalization on California’s agriculturalists based on the distinguishable intellectual capital of its members. Foundation research has assessed the impact of imperfectly competitive markets and state traders on national and California agricultural food exports. A few Foundation members orchestrated the formation of the International Agricultural Trade Research Consortium (IATRC). Giannini Foundation members have also been involved in trade policy and international trade disputes over invasive species, as well as in leadership of the Agricultural Issues Center. They have analyzed crop-specific effects of trade agreements on segments of California agriculture, such as wine trade and the associated industrial organization of the domestic and international wine markets. What we do know about the international effects of U.S. farm policy has been largely quantified by a few Giannini Foundation members. Finally, Foundation members have conducted analysis and frequently measured the environmental consequences of globalization.

With the end of the Cold War and the unraveling of the Soviet Union, there has been increased interest in emerging markets of developing countries. This is especially true in the assessment of foreign capital investments but also as a potential source of demand for higher-quality agricultural products produced here in California. In this context, members of the Foundation were instrumental in establishing the Institute for Policy Reform in Washington, D.C. As the name suggests, the focus of the institute’s research was on reform of distortionary policies that would facilitate trade and global integration of many less developed countries. Much of the research analyzed the existing governmental policies in emerging markets and how many of these policies were obstacles to economic growth. Research conducted at this institute and by various members of the Giannini Foundation has demonstrated that California’s

comparative advantage in the production of high-quality food products is propelled by sustainable economic growth in such emerging markets.

**Potential Future Watershed Events**

What watershed events are going to be the focus for the immense intellectual capital of the Giannini Foundation over the next seventy-five years? Among the likely candidates are knowledge and technology, competition for scarce resources and increasing scarcity of resources in California, global warming, bioterrorism, product differentiation and value-added products both domestically and globally, and opportunities for economic and financial innovation.

The ongoing processes related to knowledge and technology are globalization, the industrialization of agriculture, privatization, environmentalism, and consumerism. Biotechnology and information technologies are here to stay and intellectual property rights will become even more important. California’s agriculture is evolving to become not only the producer of high-quality differentiated products but also a supplier of intellectual property, including production and marketing skills. Knowledge and technology will also be critical in facilitating the California resource base to enhance quality of life, recreation, and valued environmental services. The Giannini Foundation will logically be able to help guide and take part in such unfolding transitions.

California can no longer grow by taking advantage of its scarce resources, including land, water, and air. So long as our economy continues to grow, the urban, affluent population will demand ever more environmental quality: clean air, open space, and restored habitats, including fisheries. This demand places additional pressure on available natural resources. Environmental interests apply even greater pressure on restricting the use of land and water resources. Faced with ill-defined property rights, especially in water and forestry systems, Giannini Foundation members should be in the forefront of objective research on the consequences of increasing demand for environmental quality and the changing nature of demand for resources. Foundation members should also be increasingly engaged in conflict resolution of disputes about resource allocation.

California’s water system is close to “tapped out.” There are already more than 5,000 dams in California, 1,400 of which are “large.” In the Central Valley alone, more than half of all flows are already diverted. There are many interests whose incentives are not aligned, including commercial and real estate land developers, municipalities, agriculture, fish resources (endangered species), hydroelectric power, Native American tribes, industrial process water users, and urban dwellers. Giannini Foundation intellectual capital should certainly continue to promote balance among these water resource interests by designing solutions to California’s water shortage, which will intensify as population growth continues or as temporary droughts emerge.

The Giannini Foundation must also address conflicts among urban, agricultural, and forestry sectors over land use, ecological and community preservation values, and the remediation and reuse of contaminated sites, as well as the financing and redevelopment of economically obsolete city cores. Foundation research is already
under way to develop solutions as competition for land use intensifies. In the case of forest resources, Foundation researchers will continue to assess the public interest and the current stock of harvestable timber in conjunction with water resources. The Giannini Foundation will certainly also be involved in disputes over minerals, fossil fuels, and fisheries.

Regulation of air resources will require the active participation of Giannini Foundation members. We expect Foundation members to continue to contribute to the legislative foundation for federal and state clean air acts and regulations as they have done in the past. They should work with manufacturers and users of mobile air emission sources and evaluate trade-offs among air quality, water quality, and energy costs. Foundation researchers are likely to continue to examine stationary emission sources, health impacts of air pollution, the consumption of fossil fuels, and generation of greenhouse gases.

Five Giannini Foundation scholars are already investigating the effects of global warming on California agriculture. One such study has found air pollution to be a major concern for the future of the Central Valley. Global warming will have varying impacts on regions and possible dire geopolitical consequences. As energy markets tighten, there is an increasing need to transition away from fossil fuel. Biofuels are a source of hope, but they must become more productive and efficient as they, too, require land and other resources. These new challenges for California agriculture should result in future Giannini Foundation research to design policies and institutions that will enhance the welfare of California agriculturalists.

The potential harm of bioterrorism is on the rise in America’s complex agrofood system. Giannini Foundation members are currently pursuing two major grants that examine different regulatory structures. For these grants, Foundation researchers are evaluating the economic value of specific food-safety measures, conducting risk assessments, and designing systems approaches for the management of bioterrorism risks. Methodologies have already been identified for prioritization of food-safety measures that could well be adopted based on sound economic criteria for multiple control steps at different stages of production and distribution that reduce bioterrorism risk.

Fragmented consumer demand and biotechnology will be the foundation for the creation of new differentiated products to capture markets such as nutraceuticals and metabolism-specific foodstuffs and diets. Here, Giannini Foundation research could be significant. For example, members could contribute to the assessment of ex ante consumer demand for green products, identify consumers’ willingness to pay for specific characteristics even when a product does not yet exist, determine the welfare effects of specific products, evaluate the factors driving consumer demand for specialized products, integrate approaches from business school marketing paradigms with cutting-edge demand analysis, contribute to interdisciplinary research in product development, analyze who benefits from specialized products, develop methods of authenticating organic products (e.g., required spatial intervals and practices for organic crops), and create programs for perceived food quality or safety (e.g., eggs from cage-free production).
Finally, the future offers many opportunities for economic and financial innovation. Key areas include environmental finance, land use and critical habitat designation, major agricultural/urban water transfers, and the structure of public/private partnerships. Future Giannini Foundation researchers will need to analyze cooperative versus noncooperative solutions and the gains from the exchange of public goods for zoning variances, adjustment compensation for industries facing increased international competition, and compensation for the reallocation of property rights. Other implications of new approaches to environmental finance require core competencies in collective decision-making, access, and stakeholder representation, as well as political bargaining and negotiation.

We also expect the Giannini Foundation to play an integral role in the institutions that manage conflicts as the growing demand for natural resources in the West is increasingly at odds with historical use patterns. There is much value added from institutions that can effectively manage these conflicts and keep natural resource constraints from becoming limits to growth. Given evolving scarcity, more creative market institutions must be designed and implemented.

Whatever challenges to California agriculturalists arise in the future, looking back over the Giannini Foundation’s legacy of methodological innovation and pragmatic, real-world problem solving, there will continue to be major contributions by Giannini Foundation research over the next seventy-five years. As previously noted, the Foundation is comprised of two of the very best faculties of agriculture and resource economics in the world and, when combined, they simply have no equal. Over the last fifty years, members of the Giannini Foundation have been the recipients of more outstanding publication awards from the American Agricultural Economics Association (now the Agricultural and Applied Economics Association) than any other land grant university in the country. The collective intellectual capital of the Foundation has steadily increased over its long history and is well poised to meet whatever intellectual challenges that may be faced by A.P. Giannini’s California agriculturalists over the next century.

NOTES


2. Given the sheer volume of work produced over the last seventy-five years by Giannini Foundation members, in general this survey will not cite specific authors and publications but will emphasize the contributions of Foundation members as a group. Readers interested in a more exhaustive listing of authors of publications are encouraged to review the *Annals of the Giannini Foundation of Agricultural Economics*, which can be found at http://giannini.ucop.edu/GFAE_Annals.pdf or one of the Giannini Foundation libraries, which house one of the most comprehensive collections in the field of agricultural economics anywhere in the world.


Warren Johnston’s charge to the alumni discussants was very open-ended—critique past accomplishments as reported, provide insightful comment about the relevancy (or irrelevancy) of seminal accomplishments, comment about observations while a graduate student working with others on applied research projects, and whatever else we choose to relate in an eight-minute presentation.

Reading the papers presented this morning and this afternoon was a rich, enlightening experience. Although I was a beneficiary of the Giannini endowment as a graduate student, I knew little about A.P. Giannini. What a remarkable role model he was for anyone interested in business or in the business of life.

The impact of his endowment on the science of economics and the agricultural industry has been well documented in this afternoon’s three papers. But the documentation has come entirely from insiders’ perspectives, from those who may have a vested interest in touting institutional accomplishments. Alumni may also be regarded partially as insiders because of the tremendous loyalty often engendered for one’s alma mater, but our comments are based on a little different perspective since our careers have developed mainly away from the UC system. As an undergraduate student at Davis, I don’t recall being aware of the Giannini Foundation. As a graduate student, the Foundation name and its impact were a bit more evident. I knew that it supported well-stocked and easily accessible agricultural economics libraries at Davis and Berkeley, sponsored a monograph publication series that every graduate student hoped to become published in, and provided modest research operating funds that students didn’t really see but somehow knew were important.

However, the real impact of the Foundation was not evident to me until after I left Davis. It quickly became apparent that no other department in the country had anything close to the valuable library resources that Davis and Berkeley had. Neither did any other institution have publication support that permitted the depth of research to be reported like that in the Giannini monograph series nor in the same quality of publication design and layout.

Several other things have become obvious to me over the years that I had not originally connected to the Giannini Foundation but today’s presentations suggest that its role probably was catalytic to the UC culture in agricultural economics. To illustrate, I have often thought of a conversation...
during one of the late 1960s departmental celebrations following receipt of yet another AAEA published research award. It was the fourth or fifth research or dissertation award received in as many years. I asked Gerry Dean why so many awards were received by faculty and students at Berkeley and Davis. His response was two-fold: California agriculture provides lots of important agricultural economic problems to study and the UC academic climate gives faculty and students lots of freedom to pursue problems they consider important and in ways that build the science. While the Giannini Foundation certainly hasn’t impacted the geo-climatic diversity of the state that supports such a diverse agriculture, it is very possible that it has contributed to the remarkable UC academic culture. The culture of hiring the best people and expecting outstanding performance, both in contributing to the science and in resolving real-world problems, was clearly evident by the time the Giannini endowment was received, but the endowment assured that the UC culture would be extended to and sustained in the field of agricultural economics.

The stature of agricultural economics at Berkeley and Davis is unambiguous. While one might dismiss the claims of internal writers that the two departments are consistently ranked number one and two in the world, external writers are generally in full agreement. By almost any standard, it is hard to find their equals. What is also interesting is that there has been only one recent entrant into the ranks of the top five departments focusing on agricultural economics and that occurred following strategic hires in the early 1980s of two senior faculty members, one from Berkeley and one from Texas A&M, and then keeping a focus on a course of excellence. My perspective of why the two UC departments have had such a long history of excellence is a combination of the extraordinary statewide agricultural laboratory, the university culture that appropriately and unapologetically values scientific discoveries along with problem resolution and effective instruction, and the high level of public and private investment in agricultural research. It is in this last area that the Giannini endowment has made the biggest contribution, but it is very likely it has also strengthened the second.

I have little to critique about any of this afternoon’s papers. They are pertinent, generally accurate, and informative. The best I could do would be to note that some of the Foundation contributions I regard as most enduring (such as the George and King, Eidman and Dean, and Just monographs) were ignored or received only passing comment, but limited space obviously prevents discussion of all the significant contributions. And that is probably the most important point that can be made about the value of the Giannini endowment. It has facilitated such a volume of high-quality contributions that a conference like this could never do full justice to what has been accomplished.

But the most important impacts to me are personal and a little more obscure. I knew the support from the Giannini Foundation was important to people who had important impacts on my life. My professional career is largely a consequence of the
encouragement and confidence of Giannini Foundation instructors and mentors like Chet McCorkle, Ben French, Gordon King, Gerry Dean, and Hal Carter. I had never met a professor before coming to Davis. The idea of becoming a university faculty member had never entered my mind before my senior year and then only because I was offered an NDEA (National Defense Education Act) Fellowship when I applied for the graduate program intending to complete a master’s degree and become a county Extension agent. It was the Davis faculty in agricultural economics, all Giannini Foundation members, who instilled in me both a desire to be an agricultural economist and a confidence that I might be able to make a valuable contribution.

It has been a pleasure to be here and an even greater pleasure to have been asked to be a participant in the symposium.
Julian writes “Foundation members have made scholarly contributions, both directly and by having influence on the work of others, especially graduates from the departments that make up the Foundation.” He circumscribes the scope of his paper by focusing on direct impacts, primarily through the marketing literature. What I’d like to do, therefore, is talk about some of those indirect impacts through “others.”

Among the “others” are legions of us who have gone to work in the public sectors—in California’s state government, the federal government, and, very likely, the governments of other countries. There we do our best to bring our training (the stuff the pointy-headed academics taught us) to bear on policy decisions. These are policy decisions that, at least at the federal level, affect growers and also consumers and taxpayers in California, throughout the country, and even in other parts of the world. As Alex McCalla taught us, markets are interconnected globally such that a large country’s agricultural policies affect other countries’ farmers.

Let me give you just a few examples of work by “others” at the federal level and focus on some contributions that pertain to marketing.

I remember when Ann Veneman came to Washington as the new secretary of agriculture. We listened closely to her early speeches because they gave us hints of what she thought was important—thoughts shaped in California by her experiences in California agriculture. She talked about things like “consumer driven agriculture” and food safety as a global issue—a marketing and trade issue requiring global solutions. It was Mary Bohman (a Davis Ph.D. in USDA’s Economic Research Service) who was drafted and tasked with developing a publication that would flesh out the secretary’s ideas so that they could form the basis for a new farm bill proposal from USDA. This was to be a proposal that would be in keeping with the realities of today’s agricultural and food markets: a global marketplace characterized by an enlarging array of finely differentiated product markets where consumers seek and value product attributes beyond taste and price, such as nutrition, safety, novelty, convenience, and how, where, and by whom a product is grown.

It was Jim Blaylock (also a Davis Ph.D. who retired just recently from USDA) who tackled this notion of “consumer driven agriculture” to put dollars and cents on it. He realized we had the data in the public sector that could be used to project demographic changes and other data that could tell us something about how food preferences and eating habits differ among different demographic groups. He led a team effort to develop empirical projections of how food demand and expenditures would change with the changing profile of the American consumer. This work turned out to be of
considerable interest to commodity groups and food associations. You can see it at www.ers.usda.gov/AmberWaves/April03/Features/ConsumerDrivenAg.htm.

About this same time a new term entered the marketing lexicon—traceability. People in policy circles were quite anxious about traceability—some thinking it would have to be mandated in order to protect the food system and others thinking the costs of traceability would drive food firms and farmers out of business. It was Elise Golan (a Berkeley Ph.D.) who helped policy-makers understand that traceability is often done voluntarily by food firms because it can be good business—a good marketing strategy, for example—and that it is possible to design relatively simple incentive strategies to get more traceability in the food system should society want it. If you’d like to see the work she led, it is at www.ers.usda.gov/Amberwaves/April04/Features/FoodTraceability.htm.

There are many “others” from Giannini Foundation departments making important contributions to policy that I could name if I had more time.

Among Julian’s “others” are also undoubtedly hundreds and possibly thousands of agricultural economists working in the private sector in California agriculture. (In fact, if you add all these folks into Julian’s ratio of agricultural economists to the value of California’s agricultural production, some might argue that ratio is too high rather than too low.) The skills and proficiencies that they bring to their jobs—such as the ability to forecast market demand, analyze pricing strategies, or evaluate the benefits and costs of trade agreements—can largely be attributed to a few professors at Berkeley and Davis and to a few more at schools like Cal Poly where people like Jay Noel—who got his Ph.D. at Davis—are on the faculty. Bringing their own research on marketing issues to the classroom and involving students in analysis and research are hallmarks of teaching by Giannini Foundation members. Shermain Hardesty is a Davis Ph.D. who worked at one time for the California Rice Growers and now directs the Rural Cooperatives Center at UC Davis.

Also among the “others” who are graduates of Giannini Foundation departments are any number of innovative courageous people who pursue neither “safe” jobs in the government nor risky but potentially lucrative jobs in the private sector. Rather, they use their knowledge and skills to make a difference in the world in different or unconventional ways. Someone said this morning that “A.P. Giannini did not work for money.” There are still some people like that today and one of them—Ann Vandeman (a Berkeley Ph.D.) is here today. She runs a small organic farming operation in Olympia, Washington, called Left Foot Organics where she employs developmentally disabled folks so that they may gain life skills. She supports her program with grants and by direct marketing to consumers through share-box arrangements and to farmers’ markets.

Finally, I would be remiss in not mentioning that Giannini Foundation member departments have trained more women agricultural economists—and I admit this is a hypothesis—than all other agricultural economics programs in the country together. I am proud to be one of them. They have trained rising academic stars like Rachael Goodhue at Davis, Jill McClusky at Washington State, and Dawn Thilmany at Colorado State; seasoned academic leaders like Jean Kinsey at Minnesota, Susan Capalbo at Montana State, Cathy Wessells Roheim at Rhode Island, and Michele Veeman in
Canada. I have already mentioned a number of women leaders in the federal government and there are a number of others that I haven’t mentioned. The only three women who have held the agricultural economist position on the staff of the President’s Council of Economic Advisers have been graduates of Giannini Foundation departments: Elise Golan, Vickie Greenfield, and me.

I do not know if all these indirect contributions through others merit more funding for Giannini Foundation departments but they are surely causes for celebration. And I am honored to be part of today’s.
I first want to thank the organizers of this Giannini Foundation 75th Anniversary Symposium. They have done a wonderful job of putting this program together and I am very pleased to be included in these festivities—although I question their rationality in paying my travel across the country to speak for only a few minutes. My lot is to comment on the presentation by Gordon Rausser, who was given the topic “The Giannini Foundation and the Welfare of California Agriculturalists in a Changing State, Nation, and World.”

In his typical character, Gordon always chooses lofty goals. As far as I can tell, within the confines of his charge, which is somewhat restrictive, Gordon has tried implicitly to prove two propositions, although neither is stated explicitly. The first is that the Giannini Foundation is the greatest collection of agricultural economists in the world. The second is that the Giannini Foundation has successively addressed and resolved, as they have arisen, all the major issues that have faced society in the last seventy-five years.

On the first proposition, I think he has been fully successful. Hands down, the Giannini Foundation is and has been the best collection of agricultural economists in the world. But I do not applaud his effort too much in proving this proposition because anyone in the room could have proven the same proposition given that the record is so clear. However, so that I do not get shot when I go home, I add that this proposition only holds for the Foundation as a whole rather than for the departments individually. There is at least one other department that is considered comparable to the two departments here, as already acknowledged by Gordon (although we shall leave that department unnamed on this day of celebration).

As far as his second proposition, that the Giannini Foundation has successively addressed and resolved every major issue facing society, I can think of only a few exceptions. First, we still have war in the Middle East and, second, Israel still has not achieved peace with the Palestinians.

In all seriousness, however, as both an alum and long-time member of the Foundation and Berkeley faculty, I want to point out by way of personal experience a few strengths of the Foundation that have not been recognized yet today. Although Julian Alston alluded to flexibility as being a strength to the departments due to the Foundation, the first experience I wish to relate is an example of that flexibility that has had a profound effect in my life.

One late April afternoon in 1969, after two and a half years in college, I was nearing completion and thought it was time for me to think about graduate school, although I really had not done so seriously yet. Not really being aware that all of the assistantships had already been allocated and that I was well past the official deadlines for application, I walked into the office...
of Vernon Eidman, another Giannini alum then on the faculty at Oklahoma State University. Knowing something about my academic standing, he ended up suggesting that I consider graduate school at Berkeley. By the end of that thirty or forty minute conversation, he had called Pete Helmberger, who was the graduate director at Berkeley, and I was offered a Giannini fellowship to attend Berkeley and had pretty well made up my mind to attend graduate school there. Just four or five months later I was in Berkeley starting a Ph.D. program. That could never have happened without the flexibility of the Giannini Foundation. I have no clue how my life, as well as my professional career, would have unfolded if that chain of events had not happened on that spring day. Accordingly, I feel a great debt of gratitude to the Giannini Foundation for that opportunity.

The second experience relates to how valuable is the heritage of the Giannini Foundation. It is worth far more than all the money in the corpus that has been discussed so much thus far today. The year before I joined the Foundation as a faculty member, the faculty of the Berkeley department was almost completely decimated. All the great faculty members hired in the 1930s were coming to the ends of their careers because of retirement, death, or other physical limitations. Andy Schmitz was on sabbatical in Canada and Alain de Janvry had been away, I believe in South America, for an extended period. There was even talk about closing down the department. In fact, I suspect that uncertainty about whether to go forward with hiring replacement faculty had something to do with extended delays beyond the departmental level about whether to approve my hiring. The final approval above the department required many months longer than normal and was not finally resolved until two days before I was supposed to move my family and show up for work.

When I walked in the door, all the graduate students came to meet me on the run looking for guidance. When Andy returned, together we had virtually all the resources of the Foundation at Berkeley at our disposal, which made that time incredibly productive. Then, in the first five years I was there, we hired Michael Hanemann, Peter Berck, David Zilberman, Gordon Rausser, and Irma Adelman in about that order. In the next five years, we hired Brian Wright, Tony Fisher, and Larry Karp. (If I have left out anyone, it was unintentional.) By that time we had a core of faculty in place that assured the department would be among the best in the world, if not the best, for the next thirty years.

One reason I was enticed away to Maryland after that was to see if we could build up a top-ranked department elsewhere as had been done at Berkeley. Based on that experience, I can assure you that it is not nearly so easy to build a great department without the great heritage of the Giannini Foundation. The social and institutional capital you have in the Giannini Foundation is worth far more than all the money in it that has been discussed thus far today.

In closing, I wish to express gratitude for what the Giannini Foundation has done and pay tribute to the many early members whose contributions made its heritage what it is today.
IT is a pleasure to be here. My family has a long association with the Giannini Foundation, starting in 1959 when my father, Dr. Eric Thor, moved the family to California so he could join the UC Berkeley faculty as a proud member of the Giannini Foundation and continuing through the 1970s, when each of my brothers earned a Ph.D. in Agricultural Economics from Berkeley.

Through the years, some of the Giannini Foundation family became almost like members of my family. After my father’s passing in 1981, some like Jerry Siebert and Hoy Carman became my mentors as I went through the Ph.D. program at UC Davis.

I fondly read these papers presented today, somewhat reminiscing the Giannini of old, where a team approach amongst the faculty and also with industry propelled California agriculture forward. A number of comments in several papers talked about the uniqueness of California agriculture that creates a singular importance of having research and cooperative work “side by side” in this state.

I also fondly recall the teaching expertise that many of the faculty in the 1970s and 1980s brought to the classroom. They were there because of the desire to contribute to the knowledge base and problem-solving capability of the students of the day. Among my vivid memories during the first year of the Ph.D. program was a lecture by Dr. Paris. Apparently the faculty was concerned about the rate at which we were dropping out of the Ph.D. program since only four of eleven eventually finished. However, Dr. Paris challenged us in a way that has meant many things to me over the years. He said you must choose in your life whether you are going to be an expert in one tool and apply that tool to every problem in a simulated environment or whether you are going to develop a toolkit here at Davis with which you will be equipped to analyze the variety of problems you will encounter in the real world. On that day, Dr. Paris ceased scaring me to death and changed my approach and attitude within the Ph.D. program. It also seemed prophetic as to the specialization and compartmentalization that challenges the Giannini Foundation.

The special encouragement by Professors Carman, Shepard, Jesse, and others reminds me always of that special bond between those that embraced the Giannini mission summarized by Sproul “to study and make better known the economic facts and conditions upon which the continued solvency and prosperity of California’s industry must of necessity rest.”

As someone with two generations and nearly fifty years of exposure to the Giannini Foundation, and as a representative of industry here, I offer a couple of observations about the university and the Giannini Foundation.
1. Never has the need been greater and never before have your skills and tools been more in demand than they are today. Has the Giannini Foundation become relatively isolated and irrelevant at the very time it could be taking a leadership position and making major contributions to some of the large issues facing our society?

a. Is it just for academic research? What has happened to the pragmatic interaction between the university and industry?

b. Who is there with a better capability to help translate the research papers into implementable policies and industry practices? While it will not necessarily help the publication count, it is where I believe that the greatest contribution can be made.

2. The world has gotten much smaller due to advanced communications and transportation. So, too, the uniqueness of our issues is evaporating. While the crops may be different and there may be more perishable and time-oriented aspects to some of the specialty crops, California agriculture must face facts that on almost every front we are being attacked and our infrastructure is in jeopardy.

3. Leadership is a global matter. So are our problems. Having lived overseas for a number of years, I can tell you that Americans delude themselves about their free-trade and fair-trade practices. However one might measure them, the reality is that the United States is viewed with as much skepticism for its trade and economic policies as it is for its political ones.

So the challenge is this: Can the University of California and the Giannini Foundation, with its rich history and tremendous resources, including some of the best-trained minds in the world, reinvigorate itself beyond the narrow, the short-term, and the individual in favor of giving something special to California and the world of food and agriculture?

I believe it is possible to take a leadership position and engage both political and industry leaders in a way that propels the betterment of society as a whole, creating a vision of the future, and recommending many of the changes that we know will eventually be required for our state and our children to move forward.

• Examples found in the early days of the Giannini Foundation talk about things like water policy and population growth, land use and urbanization policy, taxation issues, energy independence. Let’s stimulate efficient use of resources.

• As I have gotten older, I have become more and more cynical of our political process but I also recognize that people, if left to their own devices in an unorganized way, do not always do the right thing unless they have an incentive to do so.

Let’s stimulate development of industries in California that will be naturally advantaged via California’s current infrastructure, e.g., biotechnology, alternative energy, ultra-intensive farming of renewable resources, etc.

• Let’s examine and implement “fair” phytosanitary requirements. Level the playing field for domestic industry via labeling requirements of raw material origins and up-to-date product standards of identity. Promote research that can quickly identify adulterated products, which can also be used in anti-terrorism.
• Let’s develop analysis and provide leadership in policy implementation to protect our agricultural land base and more efficiently and proactively grow the products for which we have a sustainable competitive (natural) advantage. At the same time, we have to have the courage to let go and phase out the artificial inducements to products that are produced here because of regulatory or subsidized advantages.

Is it time for the Giannini Foundation and University of California to engage the leaders of this state, both industry and political, making us proactive by looking ahead at what should be done? Let’s “get out front” on issues that pragmatically work to the benefit of producers, consumers, and the state. We must somehow get back the sense of belonging and engagement that seems to get lost in today’s rapid-pace environment. Yet if anyone or any institution has both the charge and the capability to effectively evaluate alternative courses of action and chart a course for the next one hundred years, it should be the University of California and the Giannini Foundation.