Agricultural and Resource Economics
UPDATE
GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS • UNIVERSITY OF CALIFORNIA
V. 11 no. 2 • Nov/Dec 2007

Farm Subsidies and Obesity in the United States

Julian M. Alston, Daniel A. Sumner, and Stephen A. Vosti

The claim that farm subsidies have contributed significantly to making Americans fat by making fattening foods relatively cheap and abundant has become accepted as "fact" in the popular media. We show that there is no evidence to support this claim. While many arguments can be made for changing farm subsidies, even entirely eliminating the current programs would not have any significant influence on obesity trends.

Also in this issue

Obesity has increased rapidly in the United States (Figure 1) and the related health concerns are priority issues for the U.S. government and the medical community. Many health professionals now consider excessive body weight to be *the* key health problem in the United States today. The high and rising rate of obesity among children is of particular concern (Figure 2). In addition to contributing to soaring health care costs, obesity reduces worker productivity and imposes other private and social costs.

The U.S. government has a stated objective of reducing obesity and has considered a number of strategies. Options include ever-more-vigorous public education programs and regulatory or fiscal instruments that attempt to discourage "unhealthy" consumption choices and encourage "healthy" ones. For instance, analysts have discussed banning certain types of advertising, taxing certain foods, or subsidizing healthy food choices.

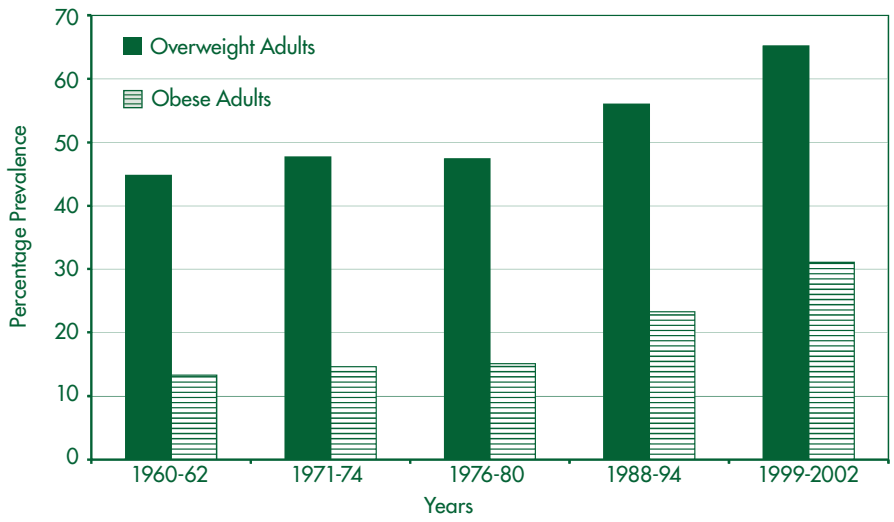
One popular idea is that American farm subsidies contribute significantly to obesity and that reducing these subsidies will go a long way toward solving the problem. For instance, writing in the New York Times, October 12, 2003, Michael Pollan claimed:

> "[Our] cheap-food farm policy comes at a high price: …[with costs including] the obesity epidemic at home – which most researchers date to the mid-70s, just when we switched to a farm policy consecrated to the overproduction of grain. Since that time, farmers in the United States have managed to produce 500 additional calories per person every day; each of us is, heroically, managing to pack away 200 of those extra calories per day. Presumably the other 300 – most of them in the form of surplus corn – get dumped on overseas markets or turned into ethanol."

Pollan and others making such claims generally treat the issue as self-evident, and do not present details on the mechanism by which farm subsidies are supposed to affect obesity, nor evidence about the size of the impact.

U.S. farm subsidy policies include both farm bill programs and trade barriers that raise U.S. farm prices and incomes for favored commodities. These policies support farm incomes either through transfers from taxpayers, or at the expense of consumers, or both. Thus, they might make agricultural commodities cheaper or more expensive and might therefore increase or reduce the cost of certain types of food.

Figure 1: Percentage of U.S. Adults Who Are Overweight or Obese



Source: www.cdc.gov/nchs/about/major/nhanes/datatblelink.htm

Nevertheless, the idea that farm subsidies have contributed significantly to the problem of obesity in the United States has been reported frequently in the press and has assumed the character of a stylized fact. Given the importance of the issue and the potential significance of the claim, we initiated a project jointly with colleagues from the Department of Nutrition at UC Davis and the Department of Economics at Iowa State University to examine the links between farm commodity subsidies and obesity. This article presents a summary of our findings.

Conceptual Links between Farm Subsidies and Obesity

The cause of obesity is simple and not disputed: people consume more food energy than they use. Of course, both consumption and use sides of the equation involve complex dynamics, and many aspects of the relationships are not clearly understood. But clearly obesity relates to food consumption, and nutritionists highlight the role of certain types of foods. The quantities demanded of these foods depend primarily on food preferences, incomes, and relative prices. No one claims that farm subsidies affect food preferences or average per capita incomes. Farm subsidies do, however, affect markets for farm commodities, and thereby—through the effects on commodity prices—indirectly affect food prices and thus may affect food consumption choices. Consequently, farm subsidy policies could contribute to lower relative prices and increased consumption of fattening foods by making certain farm commodities more abundant and therefore cheaper. However, each of several component elements must be true for farm subsidies to have had a significant effect on obesity rates. First, farm subsidies must have made farm commodities that are important ingredients of relatively fattening foods significantly more abundant and cheaper. Second, the lower commodity prices caused by farm subsidies must have resulted in significantly lower costs to the food industry, and cost savings to the food marketing firms must have been passed on to consumers in the form of lower prices of relatively fattening foods. Third, food consumption patterns must have changed significantly in response to these policy-induced changes in the relative prices of more-fattening versus less-fattening foods.

In fact, the magnitude of the impact in each of these steps is zero or small. Let us consider each step briefly. First, the evidence indicates that farm subsidies have had very modest (and mixed) effects on the total availability and prices of those farm commodities that are the most important ingredients in more-fattening foods. (More on this evidence is provided below.) Second, such small commodity price impacts would imply very small effects on costs of food at retail, which, even if fully passed on to consumers, would mean even smaller percentage changes in prices faced by consumers. (The cost of farm commodities as ingredients represents only a small share of the cost of retail food products; on average about 20 percent, and much less for products such as soda and for meals away from home, which are often implicated in the rise in obesity. Hence, a very large percentage increase in commodity prices would be required to have an appreciable percentage effect on food prices.) Third, given that food consumption is relatively unresponsive to changes in market prices, very small food price changes induced by farm subsidies could not have had large effects on food consumption patterns. In what follows we emphasize the first step in the chain, the effect of farm subsidies on farm commodity prices since, if these effects are small, the subsequent impacts must be very small.

Farm Subsidies and Commodity Prices in Reality

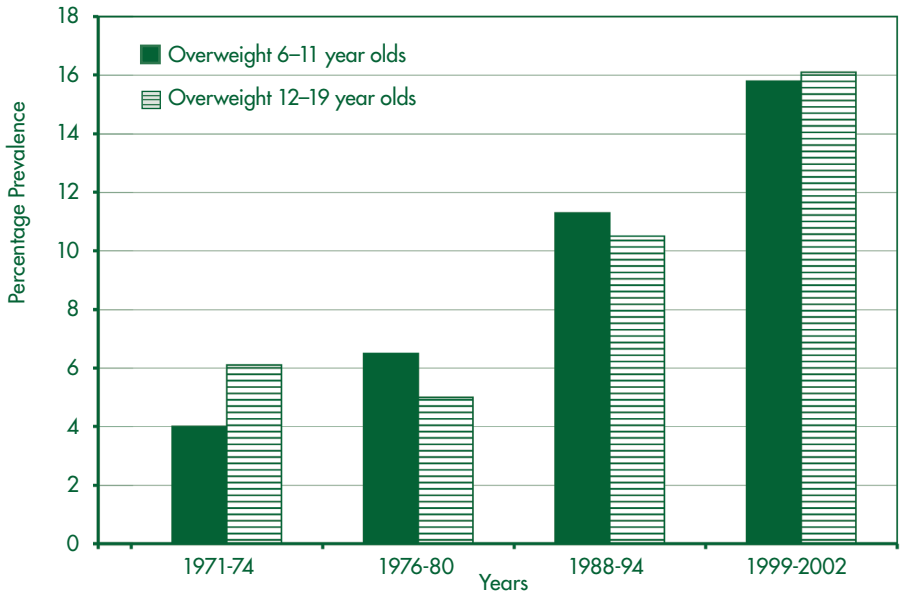
A simplistic model of farm subsidies and obesity, which is implicit in some writings on the subject, presumes a text-book subsidy policy that results in an increase in both production and consumption of the subsidized good by increasing the net return to producers (the market price plus the subsidy) and lowering the market price paid by consumers. If such subsidies had been applied more generously to more-fattening foods or their main ingredients (say sugars, starches, and fats) compared with less-fattening foods (say fresh fruits and vegetables) then

it follows that the subsidy policy was fattening; the only remaining issue would be the magnitude of the effect.

However, the main elements of U.S. farm subsidy programs are significantly different from simplistic textbook subsidy policies. Farm subsidies have resulted in lower U.S. prices of some commodities, such as food grains or feed grains, and consequently lower costs of producing breakfast cereal, bread, or livestock products. But in these cases, the price depressing (and consumption enhancing) effect of subsidies has been contained (or even reversed) by the imposition of additional policies (such as acreage set-asides) that restricted acreage or production. So the effects are smaller than the text-book model would suggest. In addition, for the past decade, about half of the total subsidy payments have provided limited incentives to increase production because the amounts paid to producers were based on past acreage and yields rather than current production. The effects of these payments are very muted compared with a text-book production subsidy at the same rate applied to current production. Finally, for some commodities (notably sugar, dairy products, and orange juice), the U.S. policy increases U.S. farm prices by restricting imports. For these commodities, the effect of the policy is to *increase* the consumer price and *decrease* domestic consumption.

Economists have modeled and projected the likely economic consequences of U.S. farm subsidies for prices and production. For instance, in 2006 the Australian Bureau of Agricultural and Resource Economics (ABARE) quantified the likely effects if U.S. farm subsidies (including import tariffs) were phased out over 10 years, 2007-2016. The ABARE estimates are summarized in Table 1. They showed that eliminating existing farm programs would have a very modest effect on farm prices and production of the main food commodities. Only sugar and rice would experience a reduction in production of more than 10 percent, and only sugar would see a price change of more than 10 percent. Importantly, the direction of the effect on price is mixed. Elimination of farm subsidies would result in increases in prices only for wheat and corn. For every other commodity the net effect of eliminating the subsidies would be to reduce the price, encouraging the consumption of meat and dairy products (albeit only modestly) along with fruit and vegetables (a price decrease of 5.2 percent associated with an increase in production of 4.4 percent), and sugar (the biggest effect, with a price decrease of 15 percent, that would be reflected more generally in the market for caloric sweeteners resulting in lower prices for all foods containing caloric sweeteners). Among all these effects, a reduction in farm prices of fruit and vegetables might have some favorable effects on nutritional outcomes, but it needs to be remembered that potatoes would account for a significant share of the increased production and consumption of fruit and vegetables; and, since almost 60 percent of potatoes are consumed as french fries or chips, the nutritional consequences may not be desirable.

Figure 2: Percentage of U.S. Children and Adolescents Who Are Overweight



Source: www.cdc.gov/nchs/about/major/nhanes/datatblelink.htm

The main message from Table 1 is that the effects of U.S. farm subsidies on commodity prices are mixed and mostly modest. Other studies have found somewhat larger effects. For instance, in a working paper prepared for the American Enterprise Institute project on the 2007 Farm Bill (see further readings), Alston estimated that eliminating U.S. program crop subsidies (but leaving other subsidies and tariffs in place) would result in an increase in U.S. crop

Table 1. Consequences in 2016 of a Complete Elimination of U.S. Commodity Protection and Subsidy Policies

	Production	Price
	(percent difference from baseline)	
Soybeans	-2.86	-1.14
Wheat	-7.58	1.52
Maize (Corn)	-3.79	0.26
Rice	-11.71	-3.87
Cane and beet	-33.31	-15.30
Fruit and vegetables	4.42	-5.16
Beef cattle	1.44	-3.31
Pigs and poultry	0.41	-0.01
Milk	-0.45	-0.01

Source: See Alston, Table 3, which was based on a table provided by Vernon Topp, ABARE, December 2006, personal communication. Effects refer to elimination of U.S. farm programs as represented in ABARE (2006) Research Report 06-10, Scenario 1.

production by 7.3 percent; 5.0 percent if the Conservation Reserve Program were eliminated at the same time. In a study published by the Cato Institute (see further readings), Sumner estimated that eliminating corn subsidies alone (i.e., leaving subsidies for other commodities in place) would result in a decrease in U.S. corn production of 9-10 percent. As would be expected, the estimated effects of eliminating subsidies for a subset of commodities are larger for those commodities (but smaller for the sector as a whole) than when eliminating subsidies for all commodities together, so the ranking of findings between ABARE, Alston, and Sumner is consistent with expectations. Even if the subsidies were responsible for reducing corn prices by as much as 10 percent, the effect on food prices and consumption would be very small. However, given that the appropriate measure should allow for the impacts of farm subsidies as a whole, the estimates at the lower end of the range are more relevant for present purposes. Alston's estimates imply program crop subsidies reduce program crop prices by 5-7 percent; ABARE's imply an even smaller price impact.

Most corn is actually consumed in the form of meat or dairy products. Corn and other feedstuff represent less than 40 percent of the farm cost of those items and the farm cost of livestock represents only about one-fifth of the retail cost of meat. Thus, even if retailers passed along all cost savings to their consumers, a 5 percent cut in the farm price of corn would imply at most a 0.4 percent reduction in the retail price of meat facing consumers. Similar calculations apply for other retail foods. Given that consumers generally show limited responses to retail food price changes, eliminating the corn subsidy would reduce corn-based food consumption by at most 0.2 percent. And remember, eliminating policies applied to other commodities would tend to reduce slightly the price of food at retail. Consequently, eliminating the policies could not be expected to have large and favorable effects on consumer incentives to eat more-healthy diets such that obesity rates would be meaningfully reduced.

The policy economics of the sweetener market raises some issues that merit some explicit discussion. Farm subsidies are responsible for the growth in the use of corn to produce high fructose corn syrup (HFCS) as a caloric sweetener, but not in the way it is often suggested. The culprit here is not corn subsidies; rather, it is sugar policy that has restricted imports, driven up the U.S. price of sugar, and encouraged the replacement of sugar with alternative caloric sweeteners. Combining the sugar policy with the corn policy, the net effect of farm subsidies has been to increase the price of caloric sweeteners generally, and to discourage total consumption while causing a shift within the category between sugar and HFCS. In this context, eliminating the subsidy policies would result in cheaper caloric sweeteners, and if anything more rather than less total consumption of sweeteners, with a switch in the mix back toward sugar.

Simple causation from farm subsidies to obesity is also inconsistent with international patterns across countries. For example, obesity trends for adult males and children in Australia are similar to those in the United States and the proximate causes (among them dramatic increases in fast food and soft drink consumption) are essentially the same, but Australia phased out its farm commodity programs over the 1980s and 1990s.

Implications for U.S. Policy

The important point of this brief article is that the magnitude of the effects of U.S. farm commodity subsidy policy on obesity must be very small. Farm subsidies have had small effects (up or down) on most farm commodity prices, much smaller effects on retail prices, and even smaller effects on consumption. Compared with other factors, the policy-induced differences in relative prices among various farm commodities have played only a tiny role in determining excess food consumption and obesity in the United States. U.S. farm subsidies have many critics. A variety of arguments and evidence can be presented to show that the programs are ineffective, wasteful, or unfair. Eliminating farm subsidy programs could solve some of these problems, but would not even make a dent in America's obesity problem.

Julian Alston (jmalston@ucdavis.edu) is a professor in the Department of Agricultural and Resource Economics (ARE) at University of California, Davis (UC Davis). Daniel Sumner (dasumner@ucdavis.edu) is the Frank H. Buck Jr. Professor in the ARE department at UC Davis, and Director of the University of California Agricultural Issues Center. Stephen Vosti (savosti@ucdavis.edu) is an adjunct associate professor in the ARE department and Associate Director of the Center for Natural Resources Policy Analysis, all at UC Davis.

For additional information, the authors recommend the following:

Alston, J.M. "Benefits and Beneficiaries from U.S. Farm Subsidies." Paper 4 of *Agricultural Policy for 2007 Farm Bill and Beyond*, B.L. Gardner and D.A. Sumner, eds, presented at the AEI conference, Washington DC, December 5-6, 2006. (www.aei.org/research/farmbill/publications/pageID.1476,projectID.28/default.asp)

Alston, J.M., and D.A. Sumner. "Perspectives on Farm Policy Reform." *Journal of Agricultural and Resource Economics* 32 (1)(April 2007): 1-19.

Alston, J.M., D.A. Sumner, and S.A. Vosti. "Are Agricultural Policies Making Us Fat? Likely Links Between Agricultural Policies and Human Nutrition and Obesity, and Their Policy Implications." *Review of Agricultural Economics* 28(3)(Fall 2006): 313-322.

Sumner, D.A. "Boxed In: Conflicts Between U.S. Farm Policies and WTO Obligations." T*rade Policy Analysis* 32(December 2005) www.freetrade.org/pubs/pas/pas.html.

USDA ORGANIC—What Is It Worth to the Consumer?

Kristin Kiesel and Sofia B. Villas-Boas

This research investigates consumer reactions to changes in information provision regarding organic production. Quantitative analyses focus on the implementation the National Organic Program and the unique nature of the fluid milk market. Our results suggest the appearance of the USDA organic seal on milk containers had an important effect on consumer milk purchasing choices and offer empirical support for the involvement of the USDA in developing uniform and standardized organic labeling guidelines.

Organic labeling is just one example of health, environmental and ethical claims increasingly being used in a variety of markets, both as marketing tools and regulatory mechanisms. The implementation of the USDA seal under the National Organic Program (NOP) in October 2002, with its national organic standard and mandatory labeling, has created a market-level experiment in a policy-relevant setting.

Governmental policies have long influenced food choices, with labels as an example of regulated information provision. This research provides a cost-benefit analysis of changes in labeling regulations under the NOP, which are essential for an evaluation of this program. It also serves as a benchmark for further government regulations of the demand of related specialty foods, such as proposed guidelines for natural products currently under consideration and the ongoing debate about appropriate labeling regarding genetic modification in food products. Focusing on milk demand is appealing, as fluid unflavored milk can be viewed as a relatively standardized and ubiquitously processed commodity. These qualities permit us to abstract from brand and taste preferences while at the same time investigating consumer preferences for privately certified rBGH-free labeled milk (Recombinant Bovine Somatotropin, is a genetically modified version of a growth hormone that occurs naturally in cows and enhances milk production), third party and government certified labeled organic milk, and conventional milk.

Unlike most of the existing literature that relies on survey response and hypothetical choice experiments, this research presents consumer valuation estimates of different labeling regimes based on actual purchasing behavior in the market place. It further provides an innovative approach for analyzing information changes. Based upon the literature on welfare estimations of new product introductions, we define the consumer product as a bundle of product attributes. Product-specific information provision via labels is modeled as additional or complementary product attributes, which allows us to compute consumers' valuation or willingness to pay (WTP) for labeling information.

Data

AC Nielsen Homescan® data track individual purchases by participating households across all chosen food channels and provides household demographics for any product purchase. Data for one major metropolitan market and a four-year period (2000-2003) were analyzed. An indicator for organic claims and the USDA organic seal was included in the data set and information provided was verified by contacting processors. Information on rBGH-free labeling was added by the researchers. The analyzed sample approaches national averages and the sub-sample of households that buy milk does not differ significantly from the entire household sample.

The data consist of 40,341 daily purchases by 927 households, who chose among 182 different milk products (16 brands) in 21 stores. Only the actual milk choices by a given household are observed, such that we construct available alternatives from observed purchases of all other households. Since we confine the created alternative choices to the store in which the household purchased milk —mainly to ensure feasibility of the data analysis—we implicitly assume that the store choice is made prior to the decision regarding which milk product to purchase.

Hedonic Approach

The hedonic price method presents an approach often used when estimating consumer valuation of goods or product attributes for which no explicit market exists. It is based on the simple intuition that consumer valuation of a product is the sum of the values of each product attribute. A market of differentiated products therefore allows us to implicitly recover the contribution of each attribute. We estimate an equation that relates the price of milk to observable attributes of milk products, such as fat content and

Table 1: Estimated Consumer Surplus Measures (in cents)

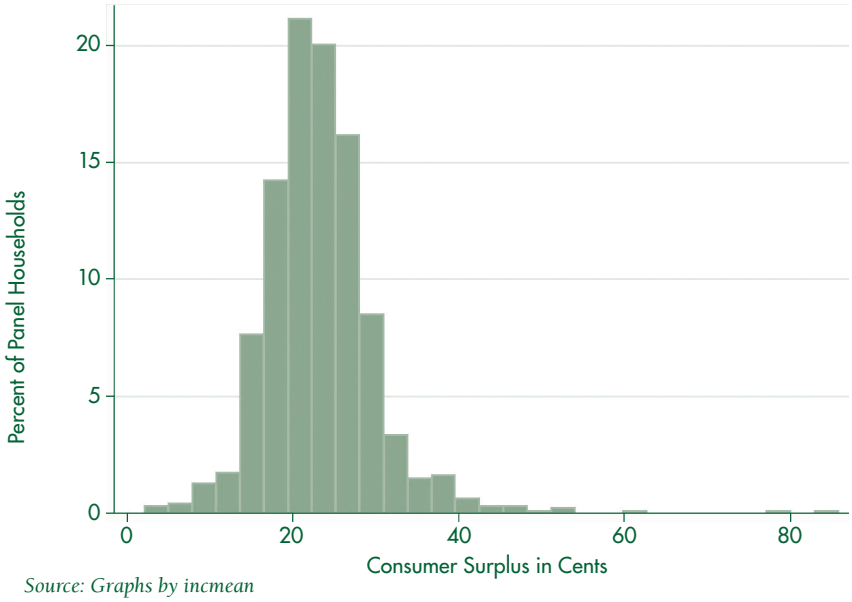
Estimated Average Consumer Valuation	Observations	Mean	95% Confidence Interval[2]	
Unrestricted consumer surplus	927	249.90*** 0.379	249.160	250.57
Restricted consumer surplus[1]	927	226.56*** 0.39	225.7928	227.33
Consumer surplus difference	927	23.34*** 0.20	22.95	23.74

*Note: Values are averaged across households, *, **, and *** denote values that are statistically different from 0 at the 10%, 5%, and 1% level.*

[1] These values correspond to the counterfactual that restricts the household choice by excluding organic milk carrying the USDA seal.

[2] Standard errors and 95% confidence intervals were computed using a nonparametric bootstrapping procedure with 20 repetitions.

Figure 1. Distribution of Estimated Consumer Surplus



Source: Graphs by incmean

container size, as well as unobserved product attributes such as organic. Estimated parameters can therefore recover the WTP for each individual product characteristic. The average WTP for changes in labeling regulations can be estimated directly, as the USDA organic seal is included as one additional relevant product attribute. We utilize variation of organic milk products in this regard, as all organic products had to be certified after the implementation of the NOP, but the display of the USDA seal is voluntary.

Our estimates of average WTP for product attributes indicate that consumers are willing to pay a premium for half gallon containers, whole fat content and lactose-free milk, as well as for all of the labels that address health and environmental-related concerns. Some consumers are willing to pay an extra $1.92 per gallon for organically-labeled milk, which increases to $2.24 in the period following labeling changes. These price premiums correspond to a 39.4 percent and a 45.8 percent price increase. Products that carry the USDA organic seal do not significantly differ in terms of price premiums from organic milk prior to the implementation of the NOP, but consumers are estimated to pay an extra 63 cents per gallon once the seal was added to milk containers. Although, the WTP for organic milk increased over time, this estimate is about twice as large as the estimated yearly organic time trend, and amounts to an 11.4 percent price increase. Milk that carries an rBGH-free label is estimated to sell at a price premium of 22 cents per gallon (9.6 percent) prior to the implementation of the NOP. This premium increases to 37 cents (14.3 percent) post introduction.

Random Utility Logit Approach

In this approach, we estimate a statistical model focusing on consumers' choices among milk products. The probability of choosing a specific milk product is estimated, with the underlying structural model based upon a random utility framework. Product attributes, product price, as well as a random term are assumed to linearly enter the utility derived from a specific product choice. A household is assumed to choose the milk product that yields the highest utility.

This specification also allows quantifying if and by how much (in monetary terms) consumers are better off by these labeling changes. This measure is computed using estimated regression coefficients and simulating consumer choice if labeling would have not taken place.

Results indicate that a one percent increase in price is estimated to decrease the probability that the milk product will be chosen by 0.59 percent. Labeling a milk product as organic has significant and very sizable effects. It increases the average choice probability by 12.0 percent. And while milk products that added the USDA labeling seal after the NOP went into effect were more likely to be chosen prior to these labeling changes (8.7 percent), this effect almost doubled to 16.1 percent when consumers could observe the seal on milk containers. Again, we see an increase in the probability of organic milk being chosen over time, but this difference in choice probabilities cannot be attributed to a general trend of increased organic purchases alone. Organic milk products that did not carry the USDA seal do not portray the

same increase. We also account for the fact that milk products carrying the USDA seal might have been more likely to be chosen prior to the implementation of the NOP. Milk products that were not labeled as organic but carried rBGH-free labels on the other hand were found to be less likely to be chosen in the time period we analyze. These results are contrary to earlier studies that also use earlier time periods and might indicate that consumers do not focus on these attributes as much or that they find information on organic production more reliable. USDA certified organic milk has to be rBGH-free, while the rBGH-free label is based on voluntary information provision by the processor only.

Table 1 summarizes estimated consumer benefits. On average, the estimates suggest that households value the USDA organic seal at 23 cents per gallon of organic milk purchased. However, the benefits for a specific consumer depend on whether and how frequently he purchases organic milk. When looking at the distribution of this measure across households (Figure 1), we find that this measure ranges from two to 86 cents, and therefore also includes the hedonic price function estimate of 63 cents.

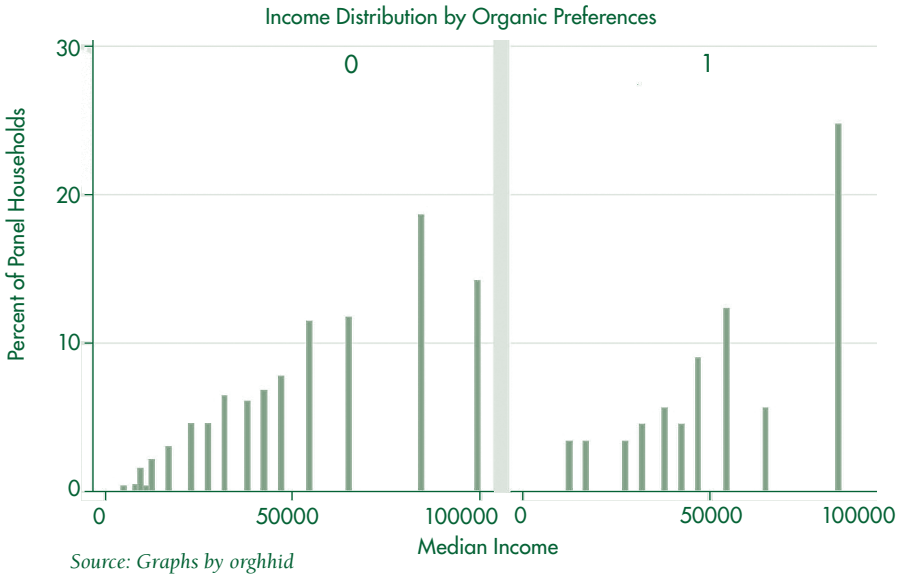
Preference Heterogeneity

Expanding on the idea, that some consumers might benefit more from these labeling regulations than others, we are also investigating observable differences across households that purchase organic versus conventional milk, as well as households that purchase organic milk in general and households that purchase organic milk products carrying the USDA seal. As a first step, demographics across households are compared graphically, with selective comparisons presented in Figures 2 through 4.

Income levels increase preferences for organic products as they allow a household to consider additional product characteristics beyond price and nutritional value. In figure 2, this is illustrated by taller bars (or a higher percentage of households) in the higher income brackets for households purchasing organic milk (right graph). Figure 3 shows significant differences regarding education levels. The proportion of households with a college-level education is significantly higher for households that purchase organic milk. Again, this is illustrated by taller bars for the *graduated college* and *post college grad* category in the right-hand graph.

Regarding labeling preferences, Figure 4 (page 8) shows potentially interesting differences that might relate to informational effects. With regards to household composition, single males are more likely to purchase milk with the USDA seal; however, this same difference is not detected for single females. Households that purchase milk carrying the USDA seal include a higher proportion of single mothers on the other hand, which could mean that they were less informed about organic production prior to the NOP due to time constraints.

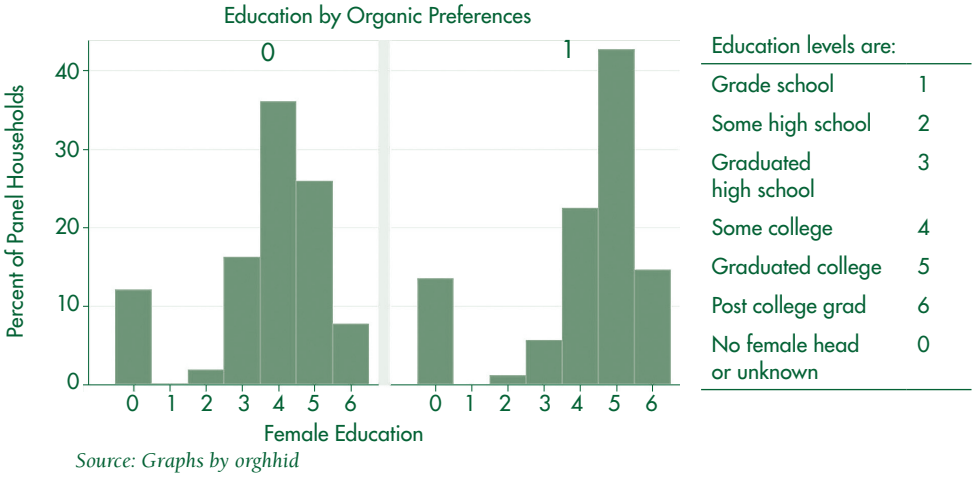
Figure 2. Income Distribution by Organic Preferences
(0 = conventional purchases, 1= organic purchases



Source: Graphs by orghhid

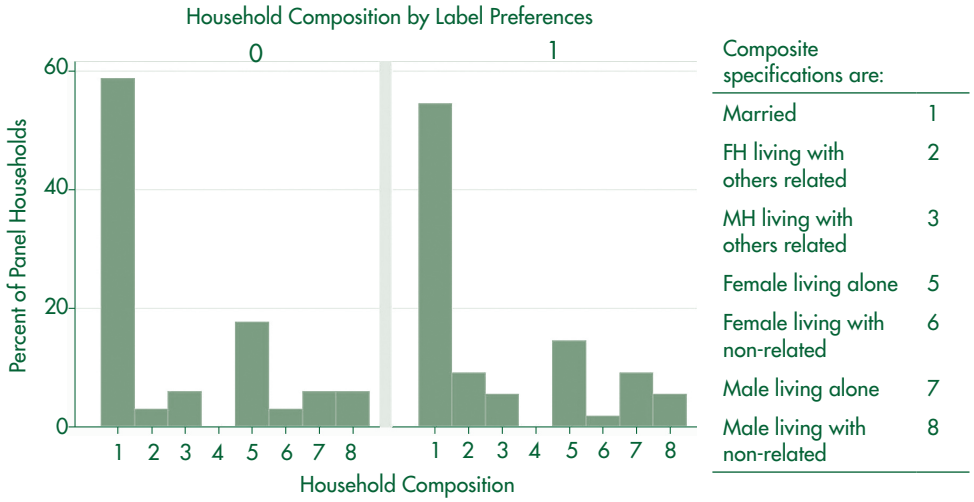
Note: Median income brackets are: 5000, 7500, 9000, 11000, 13000, 17500, 22500, 27500, 32500, 37500, 42500, 47500, 55000, 65000, 85000, 100000.

Figure 3. Levels of Education by Organic Preferences
(0 = conventional purchases, 1= organic purchases



Source: Graphs by orghhid

Figure 4. Household Composition by Label Preferences
(0 = organic purchases, 1= USDA organic seal purchases



Source: Graphs by usdahhid

The inclusion of observable household demographics in the statistical model only partially captures preference heterogeneity with regards to organic production and information changes due to labeling. This might be due to correlations of household demographics, but could also indicate the importance of unobserved differences across households such as beliefs and animal concerns.

Conclusions

The NOP and the appearance of the USDA organic seal on milk containers had an important effect on consumer milk purchasing choices. Estimated consumer valuation of the USDA seal ranges from two cents to 86 cents per each gallon, with an average valuation of 23 cents across all households.

In an alternative statistical model that focuses on price variation of differentiated milk products, the average willingness to pay for the USDA organic seal is estimated at 63 cents per each gallon of organic milk.

Graphical analyses further suggest that households with higher income, higher levels of education, small children and high time costs might have benefited relatively more from these regulatory changes. However, observable household demographics seem to only partially able to capture preference heterogeneity with regards to organic production and information changes due to labeling.

Aggregating the average estimated consumer valuation by an average purchase of 1.12 gallons of milk per shopping trip found in our data and applying the sample average annual consumption of 34.91 gallons of milk, or alternatively, the population average milk consumption of 23 gallons respectively yields an average annual benefit of $7.24 or $4.77 per household. Further aggregating this estimate by U.S. census population measures of 290,850,005 and average household size of 2.52 yields an estimate of annual consumer welfare of $857.42 million based on the sample average, or $550.40 million based on the population average. This sizable consumer benefit can be contrasted with the estimates of labeling regulations the USDA provided: The estimated costs of accreditation and labeling under the National Organic Program (NOP) alone were stated to approach $1 million and $1.9 million, respectively. A number of other potential costs such as enforcement, record keeping, and production and handling costs are also discussed but not quantified.

In conclusion, and as a result of this analysis, the estimated welfare-based consumer valuation of labeling changes alone seems to outweigh the costs incurred by this regulation. Our research therefore offers empirical support for the involvement of the USDA in developing uniform and standardized labeling guidelines.

Kristin Kiesel is a Ph.D. student and Sofia B. Villas-Boas is an assistant professor in the Department of Agricultural and Resource Economics at UC Berkeley. They can be reached at kiesel@are.berkeley.edu and sberto@are.berkeley.edu, respectively.

For additional information, the authors recommend the following:

K. Kiesel and S. B. Villas-Boas. 2007. Got Organic Milk? Consumer Valuations of Milk Labels after the Implementation of the USDA Organic Seal. *Journal of Agricultural & Food Industrial Organization* 5(4). http://www.bepress.com/jafio/

Market is Strong for California Processing Tomatoes

Colin A. Carter

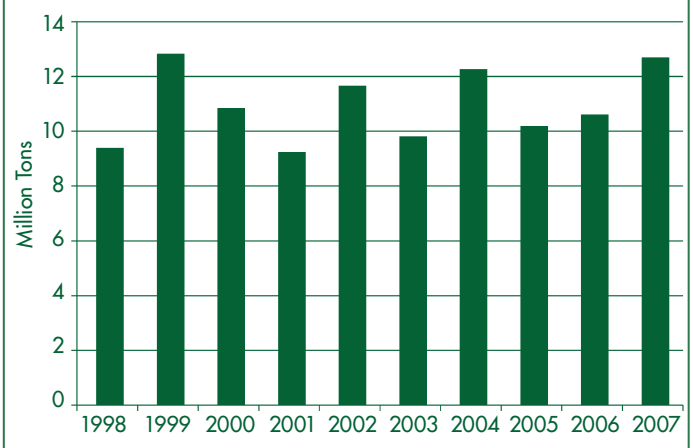
Normally a bumper crop in agriculture leads to lower prices, but not always. In 2007 California's processing tomato growers harvested a near-record crop and yet prices are rising. The international demand for California's tomato paste is strong and 2008 could be another good year for the processing tomato industry if Mother Nature cooperates.

The prospects for California's processing tomato industry have been turning positive over the last several years, and the economic situation has improved even more in 2007–2008 for growers and processors in the Golden State. Back in 2000, some industry observers predicted demise for the processing tomato market in California due to fears of excess processing capacity, oversupply, low farm gate prices, declining per capita domestic demand, and lack of international competitiveness. Those who were then writing an obituary for the California industry could not have been more wrong. Prices are now strong, acreage and processing capacity are expanding, and exports are on the rise. This is all coming together in a year when the size of the California crop is near record levels. Figure 1 shows that the 2007 U.S. harvest is expected to exceed 12.5 million tons. California accounts for most of the U.S. production shown in Figure 1.

According to the U.S. Department of Agriculture, California's processing tomato production for 2007 was higher than expected due to very favorable weather. In contrast, poor weather plagued California tomato growers in 2006. The 2007 processing tomato crop in California is estimated to have exceeded 12.1 million short tons (about 11 million metric tons). The big crop is due to increased acreage and excellent yields (about 41 tons per acre). This season's crop is very close in volume to the record 1999 crop, which led to lower prices and doom and gloom in the industry at that time. But the underlying fundamentals are much different now, with abundant optimism regarding the economic prospects for the California industry. This is not to say that uncertainty does not characterize the near-term future of the industry. One major factor facing all of California agriculture right now is a potential shortage of irrigation water in 2008. Last winter was relatively dry in California and given the poor start to rainfall (and snow) this winter, the state water authority recently informed most water districts that they may only receive 25 percent of their normal allocations in 2008. In 2007 these districts were allocated 60 percent of their normal water supply. To complicate the situation, the courts have also ordered the reduction of water deliveries to the central and southern part of the state from the Sacramento-San Joaquin Delta, to help save an endangered species of fish.

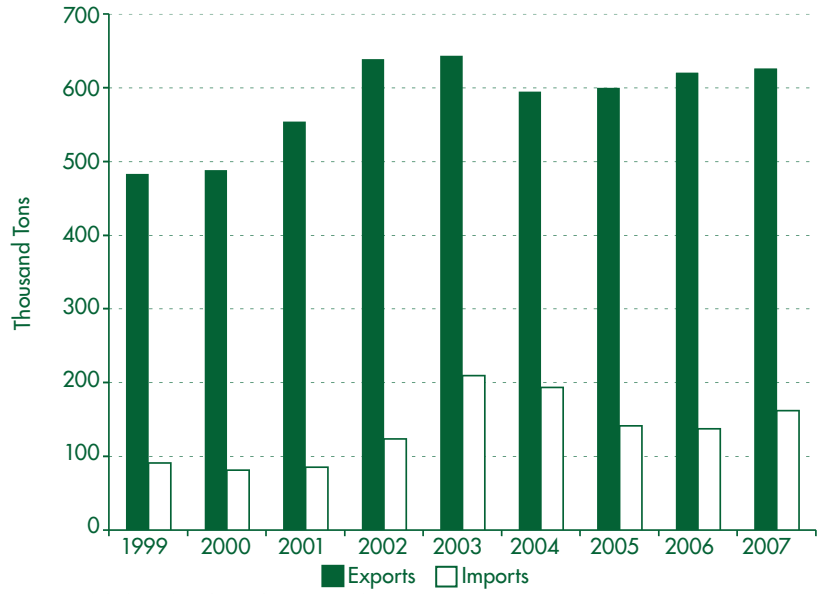
California's tomato growers are beginning to negotiate with processors for prices and acreage in 2008. The California Tomato Growers Association (CTGA) bargains on behalf of about 50 percent of the state's growers and the CTGA is asking for a price hike to $70 per ton for the 2008 crop. This is up from $63 last year and $50 just a few years ago. In addition, the growers are asking processors to share the risk associated with any increase in water costs. The growers are clearly sending a message to the processors that the farmland has other alternatives, given that many other commodity prices are up for 2008. Negotiations over prices will play out over the next few months and there may well be fewer acres of processing tomatoes in 2008. However, it is doubtful that tomato acres will drop sharply for at least two reasons. First, over 30 percent of the processing capacity is owned by growers themselves and their acreage is virtually committed to tomatoes. Second, the other processors are looking at another profitable year and

Figure 1. U.S. Processed Tomato Production (raw)



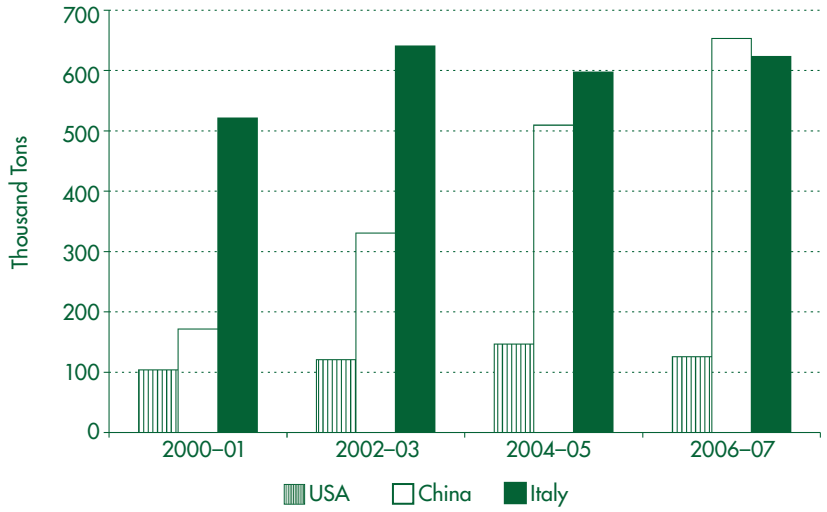
Source: NASS, USDA. 2007 is projected.

Figure 2. Italian Exports and Imports of Tomato Paste and Puree



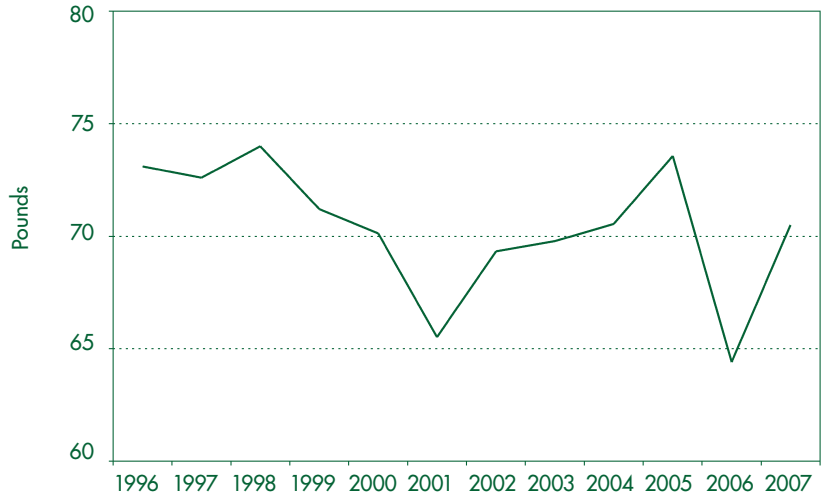
Source: Global Trade Atlas, July-June marketing year.

Figure 3. Tomato Paste and Puree Exports: Annual Average (July–June)



Note: Annual average based on a 2-year average. Source: Global Trade Atlas, July-June marketing year.

Figure 4. U.S. per Capita Consumption of Processing Tomatoes (lbs. farm weight)



Source: USDA, ERS

they are in a position to offer a good price to growers.

Apart from this uncertainty, which is not unusual, today's outlook for processing tomatoes is so much better than in 2000 largely due to strong international demand. Yes, California can effectively compete internationally in the tomato paste market. Of course, the lower valued U.S. dollar will also serve to boost California's international competitiveness in the coming months. The dollar peaked in value about five years ago, and since then it has lost about 25 percent of its value against a broad basket of currencies. However, the dollar's drop has been much steeper against the European euro. Since 2002, the euro/dollar exchange rate has fallen from 1.13 to 0.68 (euros/dollar)—roughly a 40 percent drop.

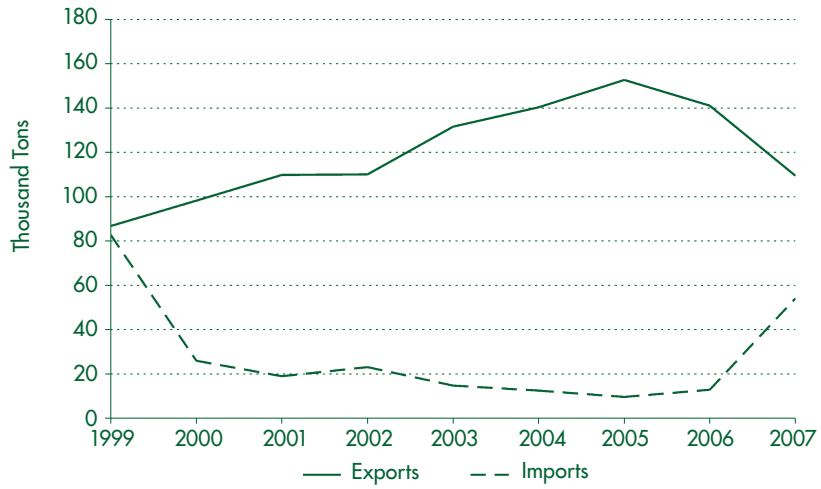
Taking a closer look at the international market for tomato paste, the large exporters are China, Italy, Spain, Portugal, the USA, Greece, Turkey, and Chile (in order of importance, based on the last three years). On the import side, the big players are Germany, Russia, Italy, the UK, Japan, France, Canada, and Mexico. Import demand growth has been exceptionally strong in some of these markets. For example, Mexico's tomato paste imports have tripled in the last four years and the volume of imports exceeded 89,000 tons in 2006–07. Russia, another big player in tomato paste, has expanded its imports by about 50 percent in the last four years, shipping in 149,000 tons in 2006–07.

Italy appears on both lists of top exporters and importers because there is a tremendous amount of intra-industry trade in tomato paste. The USA also imports and exports tomato paste, but not on the same scale as Italy. In the 2006–07 marketing year, Italy imported about 162 thousand tons of paste and puree, and at the same time exported about 626 thousand tons. In comparison, for that same year, the U.S. imported 54 thousand tons and

exported about 109 thousand tons of paste. Italy's intra-industry trade in tomato paste and puree is shown in Figure 2, for the 1998–1999, through 2006–2007 time period. Over the nine marketing years shown in Figure 2, on average, Italy exported about 583 thousand tons of tomato paste and imported 136 thousand tons. Interestingly, Italian imports in a given year exceed the total volume exported from the United States. The doubling of Italy's tomato paste imports over the time period shown in Figure 2 has allowed that country to boost its exports at the same time. China is the dominant source of Italy's imports, accounting for over 70 percent. Chinese paste is imported into Italy, repacked and/or further processed and re-exported. The Italian growers have convinced their government to erect import trade barriers against China's tomato products, but imports continue to flow despite these new trade barriers. For instance, in the past few years, Italy has tightened labeling regulations for tomato paste and introduced country-of-origin labeling that has served to discriminate against imports from China. This is bad news for Italian processors because they face a shortage of tomatoes in 2008 and beyond due to the ongoing decoupling of farm payments in the European Union—a farm policy move that is expected to lead to reduced processing tomato acreage in Italy and elsewhere in Europe.

Figure 3 displays the annual average paste and puree exports for the top three processing countries: the USA, Italy, and China. Each vertical bar in the figure represents annual average July–June exports (in thousands of tons) over a two-year period. The export boom enjoyed by China is really striking. Annual exports of paste from China averaged around 172 thousand tons in 2000–2001, and this increased by more than three and one-half times to reach 653 thousand tons in 2006 and 2007 (year ending in June), on average. From July 2006–June 2007, China exported over 715 thousand tons of paste and puree, due to rapid expansion of the domestic industry and strong global demand. Most of China's processed tomatoes are produced in the northwest province of Xinjiang, but production is also growing in the neighboring Inner Mongolia region. Inner Mongolia is well situated to service the international market.

Figure 5. U.S. Exports and Imports of Tomato Paste and Puree



Source: Global Trade Atlas, July-June Marketing Year

China's tomato paste exports are expected to be substantially lower this marketing year, due to smaller stocks coming into the 2007 harvest and serious plant disease problems in the Inner Mongolia region. Inner Mongolia accounts for about one-third of China's tomato crop and that northern region reportedly lost as much as 50 percent of its 2007 crop due to blight. This means that recent estimates for China's 2007 paste production are down from expectations.

Italy also experienced yield problems with the 2007 crop due to a hot summer and disease issues. The lighter crops in China and Italy will mean additional international demand for California tomato paste. To top things off for the California industry, U.S. domestic demand is also coming back and is expected to be up for the 2007 harvest. Figure 4 shows that U.S. per capita consumption has rebounded nicely to over 70 pounds per capita.

We see from Figure 5 that the gap between U.S. exports and imports was slowly widening over the last five or six years, until the poor harvest in 2006. In 2005, net exports reached 143 thousand tons. There is very good reason to believe that the gap between U.S. exports and imports (shown in Figure 5) will open again with the large 2007 harvest and strong overseas demand. Exports will likely balance a big production year for the California industry and carryover at the end of this year is not expected to be burdensome, which means prices for paste should hold up. California is positioning itself to maintain a larger role in the international market in the years to come.

Colin Carter is a professor in the Department of Agricultural and Resource Economics at University of California, Davis. He can be contacted by e-mail at cacarter@ucdavis.edu.

Agricultural and Resource Economics UPDATE

Co-Editors

Steve Blank
David Roland-Holst
Richard Sexton
David Zilberman

Managing Editor and Desktop Publisher

Julie McNamara

Published by the Giannini Foundation of Agricultural Economics

http://giannini.ucop.edu

ARE Update is published six times per year by the Giannini Foundation of Agricultural Economics, University of California.

Domestic subscriptions are available free of charge to interested parties. To subscribe to **ARE Update** by mail contact:

Julie McNamara, Outreach Coordinator
Department of Agricultural and Resource Economics
University of California
One Shields Avenue, Davis, CA 95616
E-mail: julie@primal.ucdavis.edu
Phone: 530-752-5346

To receive notification when new issues of the **ARE Update** are available online, submit an e-mail request to join our listserv to julie@primal.ucdavis.edu.

ARE Update is available online at http://www.agecon.ucdavis.edu/extension/update/

Agricultural and Resource Economics UPDATE
GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS • UNIVERSITY OF CALIFORNIA

Department of Agricultural and Resource Economics
UC Davis
One Shields Avenue
Davis CA 95616
GPBS