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Special Report: Marketing Issues and Opportunities in Organic Agriculture

Introduction by Karen Klonsky

Congress passed the Organic Foods Production Act (OFPA) in 1990, but the rules for implementing the law did not go into effect until October 2002. From that time forward, all agricultural commodities sold or labeled as organic must be in compliance with the national organic standards developed by the National Organic Program (NOP), created by OFPA and housed within the USDA Agricultural Marketing Service.

The standards replaced an inconsistent array of state and private certification standards for customer assurance that organic foods meet a consistent and known set of standards. Also, they were implemented to facilitate interstate commerce in fresh and processed organic food. The USDA standards mandate that genetic engineering, sewage sludge, or ionizing radiation cannot be used to produce organic food. Further, organic crop production excludes conventional pesticides and petroleum-based fertilizers with notable exceptions.

OFPA requires the establishment of a "National List of Allowed and Prohibited Substances" for organic production. The NOP crop standards require that soil fertility, crop nutrients, pests, and disease be managed primarily through cultural practices such as cultivation, hand weeding, crop rotation, and introduction of natural enemies. Only when these methods prove to be inefficient may growers use approved natural or synthetic substances on the National List.

For livestock production, animals must be fed 100% organic feed and must have access to the outdoors, including pasture for ruminants. Animals marketed as organic may not be given hormones to promote growth or antibiotics for any reason. Although, producers are also prohibited from withholding treatment from a sick or injured animal. The national standards also require producers grossing more than $5,000 from organic sales to be certified by a third-party certifier that is accredited by the USDA.

California is the leading state in organic production. According to the Census of Agriculture 2008 Organic Supplement, California accounted for 36% of all organic farmgate sales in the United States from 19% of all U.S. organic farms and 12% of all organic acres. Looking at the crop breakdown in more detail, California produces 55% of all organic fruit, 90% of all organic tree nuts, and 66% of all organic vegetables—for a total of 62% of all produce. In marked contrast, California represents only 11% of field crop production.

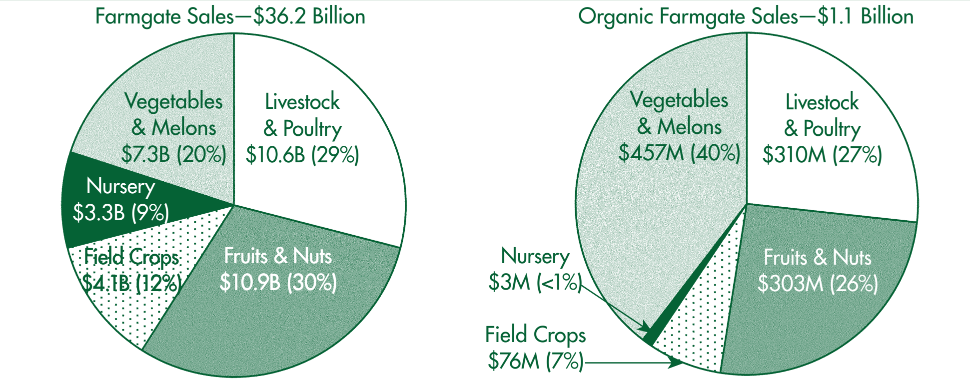
While California produces over half of domestic organic fruit, it is even more important for specific crops. Over 90% of all grapes, strawberries, avocados, plums and prunes, lemons, figs and dates—in addition to three-fourths of organic oranges—are produced in California. The only important fruit crops for which California does not dominate are apples, pears, and cherries—these are produced primarily in Washington.

Grapes are the most important fruit crop, both nationally and in California—including table grapes, raisin grapes, and wine grapes—with total California farmgate sales at $111 million out of $122 million for the United States. Strawberries show the second highest revenue both in California and nationally, with $40 million in sales in California out of $44 million in the United States.

California produces two-thirds of organic vegetables and over 90% of all organic lettuce, broccoli, celery, sweet potatoes, and onions. The most important individual crop both nationally and in California is lettuce, with over

Also in this issue

Figure 1. California Farmgate Sales: Total versus Organic, 2008



Source: USDA, NASS, CA Agricultural Statistics, 2008 and Census of Agriculture-2008 Organic Survey

one-third of all vegetable sales. California organic lettuce sales are $175 million out of $187 million in sales nationally. To put this in perspective, tomatoes are the second most important vegetable crop with $36 million in sales in California and $59 million nationally.

Fruit is grown on almost two-thirds of California organic farms, by far the most dominant commodity group in terms of farm numbers. Vegetables crops are grown on 20% of California organic farms. In contrast, fruit is grown on 23% of U.S. organic farms and vegetables on 27%. Field crops are grown on 11% of California organic farms and 21% of organic acreage. In marked contrast, one-third of U.S. organic acreage is in field crops. California produces 69% of the country's organic rice, but is not an important producer of any other field crop.

Looking at livestock, California produces 43% of organic livestock and poultry and only 18% of livestock and poultry products. California dominates in chicken and turkey production (66% and 31% of the U.S. total, respectively) but has a smaller presence in the production of milk from cows and chicken eggs (18% and 20%, respectively). Nonetheless, milk from cows and broiler chickens are the second and third most important organic commodities in California, with $134 million and $129 million in sales, respectively.

Animals raised in accordance with the NOP are required to eat 100% organic feed. California produces only 15% of organic hay in the United States and less than 2% of corn for grain or silage. Therefore, organic livestock producers in California typically import organic feed from other states.

It is important to keep organic agriculture in perspective. In California, organic represents only 3% of farmgate sales, $1.1 billion out of $36.2 billion in 2008. Organic penetration is highest for vegetables, at 6% of farmgate sales (Figure 1). While vegetable production is a healthy 20% of all California farmgate sales, it is 40% of organic sales. In contrast, field crops contribute 12% of total sales and only 7% of organic sales. Therefore, organic agriculture is not simply a smaller version of conventional agriculture.

Another way to look at organic production is that it brought in only 0.5% of California farmgate sales a decade ago and is now over 3%—a six-fold increase. The growing importance can be explained by a number of reasons.

Price premiums allow farmers a way to diversify and increase revenue. The growth in processed organic foods provides additional opportunities for organic farmers. According to an ERS report, over 3% of new food products introduced in retail outlets are labeled as organic. Consumer demand for organic food has risen from $8.6 billion in retail sales in 2002 to $29.2 billion in 2011—according to the Organic Trade Association—compared to fairly flat food sales overall. Early in the decade, annual growth in retail sales hovered at 20% but has slowed in the past few years.

With this rate of growth, the organic industry faces several unique challenges. Worldwide demand is rising and organic imports and exports are becoming increasingly common. The United States signed an equivalency agreement with Canada in 2009 and another with the EU in 2012. These agreements will undoubtedly escalate trade of organic foods.

California's dominance in domestic organic fruit, nut, and vegetable production corresponds to a reliance on exports out-of-state and internationally. Organic foods generally command significant price premiums attributable in part to increasing demand, but also because organic food costs more to produce. In particular, organic strawberries are one of the hardest crops to grow organically and costs are higher with lower yields.

Low adoption of organic practices by grain and hay producers restricts the expansion of organic livestock production, although livestock remains the fastest growing organic sector. Organic products compete with an increasing number of labels including locally grown, natural, no preservatives, and GMO-free. Coexistence of organic grain and hay producers alongside producers of genetically modified crops will be an increasing challenge as organic feed production expands. Clearly, the organic industry is expanding but also adapting to changing policy and market conditions.

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California's Proposition 37: Effects of Mandatory Labeling of GM Food

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Californians will soon vote on Proposition 37, mandating that genetically modified (GM) food is labeled. Supporters argue that mandatory labeling responds to consumers' rights, offers greater choice, and provides more information on food content. But the specifics of Prop 37 will result in a much different outcome. Food category choice will decrease and the added labeling information will be imprecise. Prop 37 will introduce a double standard for accidental GM purity in organic versus non-organic foods, favoring organic.

In the upcoming November election, California voters will decide the fate of the "California Right to Know Genetically Engineered Food Act," Proposition 37, a law that would mandate labeling of foods produced from genetically modified (GM) crops—also known as either biotech or genetically engineered (GE) crops. Consumer activists, lawyers, and organic-food groups are behind the initiative, while agribusiness, food manufacturers, and retailers are opposed.

Significant funding for both sides of the issue is coming from outside California, so there is national interest in Prop 37. Recent attempts to pass mandatory GM labeling laws in states such as Connecticut and Vermont or at the Federal level have failed.

If implemented, Prop 37 would begin to take effect in 2014 with some minor exemptions in place until 2019. It would constitute the first mandatory GM labeling law in the United States. Prop 37 would apply the strictest threshold level for unintentional traces of GM ingredients of any international mandatory labeling scheme, including that of the European Union (EU) where the threshold is 0.9% for adventitious (accidental) presence of GM. The California initiative would implement a zero-tolerance policy for accidental presence of small amounts of GM substances, even if the U.S. government has approved the GM material for human consumption.

It will be impossible for farmers and the food industry to comply with such an impractical tolerance standard. In the U.S. where GM crops are common, zero tolerance for commingling with non-GM is not feasible due to the technicalities of grain production, handling, processing, and storage. Adventitious presence of unintended ingredients is an issue for all foods, not just GM foods, and it is acknowledged as a feature of a complex food system.

Other countries that have introduced mandatory GM labeling have established thresholds to cope with the practicalities of low levels of unintended material. For instance in Japan, a country much more averse to biotech foods than the U.S., the legal labeling tolerance level for the accidental presence of GM ingredients in non-GM food is 5% of the top three ingredients. The Japanese government acknowledges that a total and complete separation of dust and admixtures from GM and non-GM crops along the entire production and transport chain is not possible. As a result of a practical labeling scheme, the Japanese consumer can purchase non-GM products that are not organic, an option that would all but disappear with Prop 37 in California.

Furthermore, in Japan, like in Australia, highly processed products such as canola oil, produced with GM crops, are exempt from labeling. In contrast, the same canola oil would have to bear a cautionary label under Prop 37, in spite of difficulties testing whether the oil has indeed been derived from GM canola.

Earlier this year, the American Medical Association formally opposed the mandatory labeling of GM food. The National Academy of Sciences and the World Health Organization previously reached similar conclusions–there is no science-based justification for mandatory labeling of GM food because there is no evidence that such foods pose any risks to human health. Because it will be interpreted as a warning, mandatory labeling would imply a food safety risk that does not exist, and this in itself would be misleading to consumers.

If passed, the full economic effects of Prop 37 are uncertain but there is no doubt that the measure would remove most of the certified non-GM processed foods from the California market because of the zero tolerance criterion for low levels of unintended material. Food manufacturers and retailers would be unwilling to supply a large number of both GM and non-GM processed food products due to litigation risk.

For instance, there would be a change in the selection of corn flakes boxes on the food shelf. The consumers' choice would be either organic corn flakes or corn flakes labeled as possibly containing GM. It is believed that 70–80% of processed food intentionally contain some corn, canola or soy ingredients, so these products

Table 1. Key Elements of Proposition 37

- Would become law on July 1, 2014.
- Would change CA state law to require that some Genetically Engineered (GE) foods sold through retails stores be labeled as such, with the Department of Public Health responsible for enforcing the labeling requirements.
- Wording on labels would vary by product and read as follows:
  1. "Genetically Engineered" on the front package for raw foods. If the item is not separately packaged these words would appear on the shelf.
  2. "Partially Produced with Genetic Engineering" or "May be Partially Produced with Genetic Engineering" for processed foods containing GE ingredients.
- Requires farmers, food manufacturers, wholesale merchants, and retailers to maintain traceability records for products not labeled.
- Excludes from labeling certain food products: alcoholic beverages, organic foods, food derived entirely from animals (meat, eggs, and some dairy products) and restaurant food.
- Excludes certain raw foods produced without the intentional use of GE seed.
- Prohibits the use of terms such as "natural," "naturally made," "naturally grown," and "all natural" in the labeling and advertising of GE foods, or possibly all foods.
- After July 1, 2019 the tolerance level for adventitious presence of GE ingredients is zero. Between 2014 and 2019 there will be a very low level tolerance for ingredients that account for less than 0.5% of final product weight.
- Opens the door for consumer litigation against farmers and firms in the food industry with potential damages equal to or greater than the retail price of each package or product alleged to be in violation. Consumers could successfully sue without being required to prove any specific damage from the alleged violation.

Source: http://www.sos.ca.gov/elections/ballot-measures/qualified-ballot-measures.htm

would have to be labeled, reformulated with non-GM substitutes, or removed. Other processed food products that do not use soy, corn, or canola could also be affected and require labeling, because they might contain unintended trace amounts of corn, canola or soy.

As a consequence, Prop 37 would result in many products on the food shelf carrying a GM label. It might get to the point where there are so many products with GM labels that most consumers would just ignore the labels because they would be everywhere.

For foods that contain a relatively small amount of corn or soy ingredients, the food industry could either label their products as GM (regardless of actual content) or look for alternative, and possibly inferior, non-GM substitute ingredients to avoid labeling. For instance, food companies would have an incentive to use alternative ingredients such as imported palm oil to replace soybean or canola oil, despite potential health problems associated with palm oil and environmental concerns due to palm oil expansion in Asia.

Mandatory labeling requirements could inhibit further development of GM technology in California's food industry. The United States has criticized the EU's mandatory GM labeling as being nothing more than international trade protection from foreign competition. In fact, over the last twenty years, the USDA, the FDA and the State Department, under successive administrations from both sides of the political spectrum, have publicly opposed this type of regulation at the international level because of its market distorting effects. Prop 37 may also be interpreted as an attempt to stifle competition and distort markets.

In this article we outline the economic implications of GM food labeling programs to provide insight into the likely effects of introducing mandatory labeling of GM foods in California under Prop 37.

Supporters of Measure 37 argue that labeling provides California consumers additional information and allows them to avoid consuming GM food. But California food consumers have that choice now. They can purchase from three different food categories: 1) conventional foods (which may or may not contain GM), 2) organic foods (non-GM), or 3) voluntarily labeled non-GM food that is not organic.

Compare this current situation to the likely outcome under Prop 37 (see Table 1 for Prop 37 details). For targeted food products derived from GM grains, Prop 37 will most likely replace the existing three food categories listed above with just two categories: 1) organic, or 2) products labeled as "may be produced with genetic engineering." In other words, there will be numerous GE labeled products.

For highly processed food products, a non-labeled option will remain but may only make sense using either lower grade or more expensive alternative ingredients. In general the organic suppliers will gain market share because the producers of most certified non-GM foods will have to change their label to read "may contain GM," whereas the organic label will not be forced to change, even if the organic product has the same trace amount of GM as the non-GM counterpart. Since the per-unit cost of producing non-GM crops is less than organic crops, overall food prices will rise on average as non-GM food products lose market share.

California Right to Know Genetically Engineered Food Act

Table 1 summarizes the key features of Prop 37–The California Right to Know

Genetically Engineered Food Act. If passed, it will require retail labeling of some raw agricultural GM commodities as being "genetically engineered" and processed foods containing GM ingredients as "(may be) partially produced with genetic engineering."

Exemptions from labeling would be granted to alcoholic beverages, restaurant and ready-made food, foods "entirely" derived from animals, and any food certified as USDA Organic. Also exempt would be any raw agricultural commodity that could be certified that it was produced without the intentional use of GE seed.

Furthermore, Prop 37 would prohibit food labels with the message "natural," "naturally grown," or anything similar. The initiative charges the California Department of Public Health with enforcement, which the Legislative Analyst Office predicts will cost $1 million annually.

Prop 37 sets purity standards for non-GM food that are much higher than existing standards for organic food. Organic certification is "process-based," which means that as long as the farm is an approved organic farm, following the prescribed agronomic practices, there is less industry concern over accidental contamination and therefore no regular testing for GM.

Unlike Prop 37, USDA organic standards do not have a strict "zero-tolerance" standard for accidental presence of GM material. In fact, the USDA has not established a threshold level for adventitious presence of GM material in organic foods. Organic growers are listed among the coalition of supporters of Prop 37, which is understandable because of the exemption provided to them by Prop 37. If Prop 37 passes, a food product could be labeled as organic and escape the testing and litigation issues facing a similar non-organic product even if both products contained identical accidental trace amounts of GM material.

Table 2. Sample Voluntary Label Today: Whole Foods and Trader Joe's

- Whole Foods 365 Everyday Value® products are formulated to avoid GE ingredients.
- All products in the Trader Joe's label promise "NO Genetically Modified Ingredients."

Mandatory labeling is unnecessary because voluntary labeling now gives California consumers a choice to purchase food products that do not contain GMOs (Table 2). One existing voluntary "GM-free" labeling program is the Non-GMO Project, a verification process organized by food retailers such as Whole Foods Market. The Non-GMO project uses the same 0.9% threshold as the EU and under this scheme, retailers receive a price premium for selling non-GM products.

Whole Foods carries numerous Non-GMO products under its private label, 365 Everyday Value®, and many of these products are also organically produced. Similarly, all food products sold at Trader Joe's with the Trader Joe's label are sourced from non-GM ingredients (according to their website), but they are not part of the Non-GMO project.

Like Whole Foods, Trader Joe's is not actively supporting mandatory labeling of GM foods under Prop 37, perhaps because it would disrupt their product lines. Several processed food products in Trader Joe's stores that are not privately branded would likely require the new cautionary label under Prop 37, not to mention all of the products under the Trader Joe's line that will not meet the zero tolerance (unless they are organic).

The issue surrounding Prop 37 is similar to an earlier debate that took place in the 1990s over dairy products from cows treated with rBST (a synthetic growth hormone that increases milk production by cows). The U.S. FDA ruled that no mandatory labeling of products derived from cows receiving the growth hormone was necessary because the milk was

These products are labeled "Natural" or "All-Natural" and they contain corn, corn meal, canola oil or soybean oil. If Proposition 37 passes, the "Natural" labels would have to be removed. The products would then have to be reformulated to avoid GM labeling or most likely labeled with "Partially Produced with Genetic Engineering."

Table 3. International Examples of GM Food Labeling

Country	Mandatory or Voluntary	Threshold Level for Unintended GMOs	Are Some Foods and Processes Exempt?
European Union	Mandatory	0.9%	Yes
Australia-New Zealand	Mandatory	1%	Yes
Japan	Mandatory	5%	Yes
South Korea	Mandatory	3%	Yes
Canada	Voluntary	5%	n/a
United States	Voluntary	unknown	n/a

n/a means not applicable

indistinguishable from products derived from untreated herds.

Then the state of Vermont passed a law requiring that milk from rBST-treated cows be labeled to better provide consumers information. The Vermont legislation was based on "strong consumer interest" and the "public's right to know." Dairy manufacturers challenged the constitutionality of the Vermont law under the First Amendment and they won.

The Second Circuit Court of Appeals struck down the Vermont law, ruling that labeling cannot be mandated just because some consumers are curious. The court ruled "were consumer interest alone sufficient, there is no end to the information that states could require manufacturers to disclose about their production methods"… "Instead, those consumers interested in such information should exercise the power of their purses by buying products from manufacturers who voluntarily reveal it." (International Dairy Foods Association v. Amestoy 92 F.3d 67 1996).

Instead of mandatory labeling, a non-rBST standard was voluntarily developed by the industry with specifications from the FDA. It has been largely applied to dairy products, giving consumers a choice; but unlike mandatory labeling, producers voluntarily responded to consumer demand for non-rBST milk, following a bottom-up process—it was not a mandate imposed on them by top-down regulations.

Other Labeling Programs

There are a variety of international mandatory GM labeling programs differing by the products to which they are applied, the mandated adventitious threshold, and whether they apply to the "product" as a whole or to the "process" (i.e., to specific ingredients). Table 3 summarizes the mandatory labeling laws of a select group of developed nations. As shown in the table, mandatory labeling of GM food exists and is enforced in places like Japan, the EU, South Korea, Australia, and New Zealand. Some developing or transition economies (not shown in Table 3) also have mandatory labeling but without strict enforcement.

With mandatory labeling, consumers are not necessarily provided with greater choice at the food store. Furthermore, there is a substantial amount of GM food eaten in the EU and Japan that does not have to be labeled. These products include certain animal products, soya sauce and vegetable oils (Japan only), among others.

Internationally, the Codex Alimentarius Commission, an international standards-setting body for food, examined and debated GM food labeling for over twenty years without reaching any consensus. In 2011 a decision was eventually made, but the final text approved by all countries does not provide any recommendation as to the labeling of GM food. It only calls on countries to follow other Codex guidelines on food labeling (whether voluntary or mandatory). This non-endorsement means that countries using mandatory labeling could face legitimate claims of unfair trade restrictions resulting in a World Trade Organization (WTO) dispute.

A labeling initiative similar to California's Prop 37 appeared on the ballot in Oregon in 2002. This initiative also proposed mandatory labeling, but defined an adventitious threshold of 0.1% per ingredient. Despite a claim of an overwhelming level of public support for GM labeling, the initiative ultimately failed with 70% voting "no." Detractors warned consumers of substantial food cost increases due to the extremely low threshold. Additionally, even if the measure had passed, it was unlikely that producers would have segregated GM foods from non-GM, non-organic, as the costs would have been prohibitive—especially for a relatively small state with a population fewer than four million.

The bulk of private costs incurred as a result of labeling requirements are from efforts to prevent or limit mixing within the non-GM supply chain, known as identity preservation (IP) programs. The cost of any IP program depends critically on the level of the adventitious presence threshold specified in the labeling program. In the case of Prop 37 these costs would be incurred throughout the processed food industry. For instance, a firm marketing a wheat food product would incur costs to ensure its product did not contain trace amounts of soy, canola, or corn, because these grains all use the same grain handling and transport system.

The goal of providing consumers with additional information and choice is only met when both (GM and non-GM) product types are carried in food stores. In the EU, companies resorted to substituting ingredients to avoid the label, using lower quality and/or higher priced inputs, something that could also happen in California for processed products. EU consumers were not offered much new information, since no products carried a GM label after the introduction of mandatory labeling. In fact, the EU proponents of labeling are not satisfied with the existing EU regulations because of its exemptions and they have asked for an extension of labeling to include animal products.

Organic Industry Impacts

Given that the proposed California threshold is 0%, a scenario in which both GM and non-GM (non-organic) products are offered side-by-side in the market seems unlikely. Some non-GM products may remain unlabeled if food companies are able to find substituting ingredients that are not at any risk of containing GM. But certified non-GM products will mostly disappear. As U.S. corn, canola, and soybean production uses primarily GM varieties, Prop 37 labeling standards will force change in the composition of retail products offered.

As the initiative applies only to California, it may not be profitable to undergo a reduction of GM inputs for one state. If this is the case, then the vast majority of food products that are not completely GM-free will bear the new label. As a consequence, a fraction of consumers now wary of the label may shift their consumption towards organic. Such a transition implies potential gains for organic growers but potential losses for conventional growers.

Today, a move towards "non-GM" or "naturally grown" labels is underway, especially with natural grocers. Some organic corn and soybean growers in the U.S. have converted back to conventional with non-GM seeds, thereby saving labor and other costs, while still getting similar price premia. The "non-GM" or "natural" products are the closest competition for organic products now; but they will be reduced or eliminated with Prop 37 due to forced relabeling and the prohibition of terms such as "naturally grown" on food labels (Table 1). Table 4 outlines the likely impacts of Prop 37 on various categories of food and beverages.

Table 4. Likely Impact of Proposition 37 on Various Foods and Beverages

Products That Will Not be Affected	Labeled as GM	Comments
Organically Certified	No	Exempt even though they may contain some low level GM
Animal Products (meat, dairy, etc)	No	Exempt even though animal feed grains are largely if not entirely GM. In addition, some animal products are produced with GM processing aids (enzymes, yeast etc.)
Alcoholic Beverages	No	Exempt even though they contain some GM or use a GM processing aid
Restaurant Food	No	Exempt but may contain high levels of GM
Fruits & Vegetables	No	No approved GM varieties at present time except some papaya and squash
Products That Will Be Affected		
Processed Foods Containing Soy and Corn Ingredients	Yes	Accounts for a very large share of items in food stores (baked goods, ready to eat foods, snack foods, etc). Will either have to be labeled GM, use alternative ingredients to avoid the label, or switch to certified organic
Non-GM Labeled Foods	Yes	Will have to carry a label due to zero tolerance and risk of lawsuit or convert to certified organic

Conclusion

The stated intentions of the California Right to Know Genetically Engineered Food Act, Proposition 37, are confusing. Although this legislation is claimed to be for the consumers' right to know, proponents have indicated this is a first step against GM foods. If Prop 37 is approved, then consumers in California could face less choice and confusing information at their food markets despite claims that Prop 37 would result in more choice and better information.

Choice will be reduced for processed foods with corn, soy, and canola ingredients, and prices of these and other processed foods will increase overall. The effects will vary by product and food company but the following three general effects can be expected:

- Certified non-GM processed food products will virtually disappear from food stores,
- Organic food will gain market share,
- Food labels will be confusing for consumers: GM labeled products could have very low traces of GM, while organic products might contain accidental traces of GM ingredients but not be labeled as such.

Background on Genetically Modified Crops

The genetic modification of plants has gone on for hundreds of years. Scientific varietal selection and crossing of most grains has genetically modified them numerous times. Genetically modified, also called genetically engineered or transgenic crops, like Roundup Ready® soybeans, are developed by transferring genes from one organism to another. For instance, the Roundup-tolerant gene comes from a natural bacterium which is found in the soil.

Compared to traditional plant breeding, modern biotechnology can produce new varieties of plants more quickly and efficiently. In addition, biotechnology can introduce desirable traits into plants that could not be established through conventional breeding techniques. In many countries around the world, ongoing research will introduce genes into crops that will give plants resistance to herbicides, insects, disease, drought and salts in the soil, as well as increasie nutrient efficiency.

GM crops were introduced on a commercial scale in the United States and elsewhere in the mid-1990s. In the U.S. commercially grown biotech crops include corn, soybeans, cotton, canola, sugarbeets, alfalfa, papaya, and squash. These first generation GM crops are characterized primarily by one or more of the following traits: disease resistance, pest resistance, and herbicide tolerance. Research is now focused on the second generation of biotech crops, expected to provide direct consumer nutritional and health benefits, such as healthier cooking oils.

The application of genetic engineering to food and agriculture is one of the most significant technological advances to impact modern agriculture, but there remains significant controversy surrounding the commercial production and marketing of biotech crops and the foods made from some of these crops. One issue is that some insects and plants are starting to develop resistance to the technology.

Around 90% of U.S corn, soybeans and cotton varieties planted are now genetically engineered. At the present time in California, the only major GM crop under cultivation is cotton. The United States accounts for over 40% of bioengineered crops produced globally. Other major adopters of this technology include Argentina, Brazil, Canada, and India.

In a recent report, the Organization for Economic Co-operation and Development (OECD) in Paris and the Food and Agriculture Organization (FAO) of the United Nations (in Rome) called for increased agricultural production in order to meet a rising demand for food. They concluded that by 2050, agricultural production must increase globally by 60% and they pointed out that biotech crops will be necessary to meet this challenge.

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For additional information, the authors recommend:

Carter, C.A., and G.P. Gruère. "Mandatory Labeling of Genetically Modified Foods: Does it Really Provide Consumer Choice?" *AgBioForum* 6, 1&2 (2003): 68-70. www.agbioforum.org/v6n12/v6n12a13-carter.htm.

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EU–U.S. Organic Equivalence Agreement: Effects on International Trade

Kaitlyn Smoot and Chiao Su

Signed in February 2012, the EU–U.S. Organic Equivalence Agreement is aimed at promoting organic food trade between the two markets. This paper outlines the basic rules enacted by this agreement, its expected impacts on trade flows, and some potential negative side effects.

On February 15, 2012 the United States and the European Union (EU) signed a historic agreement to recognize one another's organic certification programs as equivalent. The agreement, which took effect June 1, 2012, allows USDA National Organic Program (NOP) certified organic products to be marketed in the EU as "organic" using the EU organic logo. At the same time, organic products certified in Europe can be marketed in the United States using the USDA Organic logo.

The purpose of the new agreement is to reduce "red tape," lower certification costs, and expand market access for organic producers and exporters in both the EU and the U.S. The Equivalence Agreement covers only food and feed products; it does not apply to textiles, aquaculture, or personal care products such as lotions and soap.

The agreement adds the United States to the EU's list of "third countries" whose organic programs are recognized as equivalent. Products which meet the national organic standards of countries on this list can be exported to the entire EU common market and are treated as organic goods produced in the EU. For its part, the United States has previous equivalence agreements with Canada, Japan, and Taiwan. The EU has previous agreements with Argentina, Australia, Canada, Costa Rica, India, Israel, Japan, New Zealand, Switzerland, and Tunisia.

Prior to signing the agreement, representatives from the U.S. and the EU analyzed one another's programs to determine if there was adequate enforcement and to identify the major substantive differences between the programs. A 2011 report by the European Commission concluded that the United States' NOP was well-enforced, but raised several concerns regarding equivalence.

Specifically, it mentioned concerns with the definition of crop rotation, requirements for livestock living conditions, the inconsistent application of transition periods, use of manure from factory farms, and inadequate sampling of products to test for threshold levels of pesticide residues and GMO content. However, in the final draft of the equivalence agreement, these concerns were ignored.

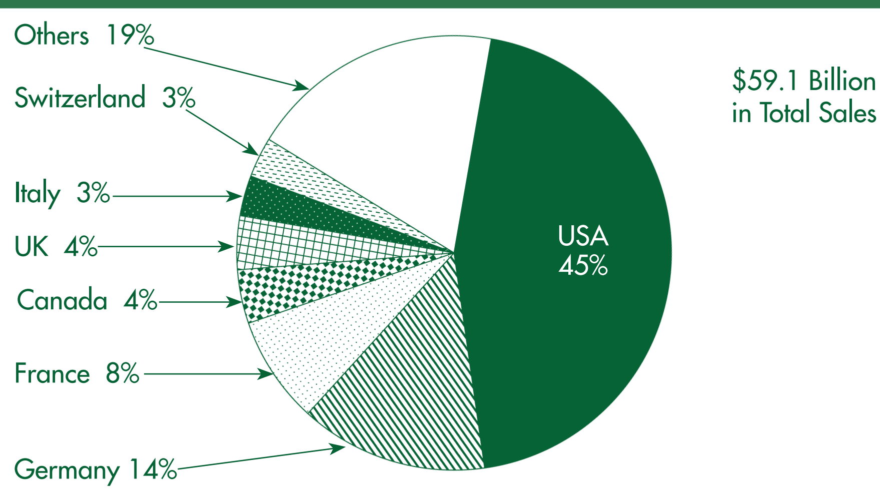
Only two issues were flagged as "critical variances," exceptions to the new equivalence agreement which require separate verification: organic livestock products exported from the EU to the U.S. may not be treated with antibiotics, and apple and pear exports from the U.S. to the EU may not be treated with tetracycline and streptomycin to control fire blight.

There are a few discrepancies regarding labeling requirements. Although the rule for "organic" processed products is the same in both the U.S. and EU—they must contain at least 95% organic ingredients—in the U.S. a product that contains 70–95% organic ingredients may be labeled as "made with organic," but this is not an option in the EU. Under the agreement, "made with organic" products will not be given the EU organic label. Furthermore, all products traded under the Equivalence Agreement must be accompanied by an organic export certificate stating the production location and the organization that certified the organic product.

The Global Organic Market

The global market for organic agricultural products has been growing dramatically over the past decade. In 2010 world organic agricultural sales were over $59.1 billion, up from $15.2 billion in 1999. The breakdown of the global organic market is shown in Figure 1. The U.S. market in 2010 accounted for $26.6 billion

Figure 1. Distribution of Global Organic Sales by Country, 2010



Source: FiBL AMI Survey, 2012. IFOAM.

Table 1. Selected U.S. Organic Exports to the EU, 2011

Product	Value Exported $1,000 USD	Quantity Exported Metric Tons	Exports to EU as a Percent of U.S. Exports of Given Product to the World	
			Value	Quantity
Cherries	3,015	541.1	10.87	9.86
Roasted Coffee	1,808	256.9	13.54	11.91
Grapes	860	186.9	0.88	1.44
Apples	514	360.7	0.98	1.11
Strawberries	313	70.6	1.90	1.98
Tomato Sauce	180	210.9	0.98	0.82
Oranges	78	111.2	0.72	0.55
Peppers	60	44.5	5.41	2.99
Carrots	59	42.7	0.27	0.26
Blueberries	20	2.9	0.09	0.12
Onion	11	22.4	0.35	0.49
Cauliflower	7	8.4	0.04	0.04
Cherry Tomatoes	4	2.8	0.37	0.35

Source: FAS Global Agricultural and Trade System Online

of organic food retail sales (45% of the world total), while the EU market accounted for $24.5 billion (41.5%).

Organic exports make up a small portion, less than 2%, of total world agricultural trade. The United States is the biggest player in organic trade; it is the biggest importer by far, sourcing products mostly from Canada and Latin America. While the U.S. and the EU are the two biggest players in the global organic market, bilateral trade between the U.S. and EU accounts for less than 5% of the total world organic trade.

The United States exported approximately $1.8 billion of organic products in 2010. Organic exports are expected to grow at around 8% annually over the next several years. Canada, with which the United States signed an Equivalence Agreement in 2009, is the primary destination of U.S. organic exports, accounting for over 50% of the total U.S. exports.

As shown in Table I, several of the major organic products exported from the U.S. to the EU include cherries, apples, tomato sauce, and roasted coffee (re-exported from third countries). The primary organic products imported from the EU to the U.S. are chocolate and olive oil.

Access to EU Market, Pre-Agreement

Before the agreement took effect, all organic products exported to the EU had to obtain a second EU certification from an accredited certifier. Such accreditation, for example ISO Guide 65, could cost the certifying body tens of thousands of dollars. The cost to the individual grower, on the other hand, was modest.

For example, Quality Assurance International (QAI) charged $300 to certify growers holding a previous NOP certification to export to the EU, while the California Certified Organic Farmers' (CCOF) equivalent certification, the Global Market Access (GMA) program, cost $250. This was a small portion of the cost of the original NOP certification, which is $1,500 in annual inspection and certification costs, plus a $275 application fee, for a farm with a production value of $450,000.

The second required step for exports to the EU was the most burdensome aspect of the whole process: paperwork requiring traceability throughout the entire supply chain. Exporters needed to obtain their own EU certification for their operation, and they also needed to supply documentation proving that all ingredients from all suppliers were EU-certified.

This could be very difficult, especially for exporters of processed products with a large number of ingredients. Clif Bar, for example, has 20–30 ingredients per flavor, which can translate into hundreds of thousands of farmers at origin and other operations along the supply chain. Also, producers were required to obtain a separate export certificate for every EU member state to which it wished to export its product.

Access to EU Market, Post-Agreement

Under the Equivalence Agreement, many NOP-certified growers in the United States are no longer required to obtain a separate EU certification. Operations that directly export organic products must still obtain a special EU certification, but growers in earlier stages of the value chain who do not themselves engage in exporting are no longer required to do so. The only exception is that all growers of apples and pears, which are ultimately exported to the EU, must be EU-certified.

Even for farmers and exporters who still must obtain the certification, the cost has been reduced. CCOF's GMA program, for example, still exists under the new regulations, but now costs only $125. Furthermore, the program has been streamlined, such that the single $125 annual fee covers export certification for the EU, Canada, Japan, and Taiwan.

These certification cost savings to individual growers are minimal, however; the primary impact of the agreement is the elimination of both the cumbersome supply-chain verification and the separate application for exports to each EU member state. This will have the largest effect on exporters of processed products that contain many ingredients, because their paperwork burden is now much smaller and they no longer need to worry about purchasing only from suppliers who have obtained an EU-certification.

Expected Impacts

Many involved parties, including representatives of the CCOF, QAI, and Organic Trade Association (OTA), predict that U.S. organic exports to the EU will increase substantially under the agreement. In her announcement of the Equivalence Agreement, U.S. Deputy Secretary of Agriculture, Kathleen Merrigan, reported that some estimates predict a 300% increase in annual trade between the U.S. and EU over the next several years. Currently, there are over 17,000 NOP certified operations in the United States. With this agreement, all of these growers and processors now can participate in the EU market with almost no trade barriers.

The increase in U.S. organic sales to the EU will likely be most dramatic in a few of the EU member countries, notably in Germany, which currently has the largest organic market in the EU and second largest in the world. Currently, U.S. organic agricultural exports to Germany are negligible, but they are expected to increase under the agreement because of the elimination of separate export certificates.

One might expect that certification bodies, such as CCOF and QAI, would lose revenues because of the reduction in the size of their international certification programs, but Jaclyn Bowen, General Manager of QAI, said that she expects to see a net gain for the company because these changes will enable them to focus on more important industry issues.

Concerns

Though the public reception of the agreement has been mostly positive, there are critics who worry that this will lead to the erosion of animal rights in the European Union because the U.S. organic program has much less strict animal rights regulations. Also, the criticism could be leveled that all such Equivalence Agreements are inappropriate because national organic standards reflect the preferences of consumers in those countries, so harmonization of standards could lead to a decline in consumer utility.

However, a study by Sawyer et al. compared the preferences of consumers in the U.S., UK and Canada, through surveys in which subjects ranked preferences for different organic standards. The results suggested that consumers do not have a strong attachment to the current national organic standards.

Next Steps in the Partnership

The agreement set up an Organics Working Group, made up of representatives from the USDA, the U.S. Trade Representative, and the European Commission. This group is scheduled to meet once a year with the purpose of exchanging information on organic practices and further harmonizing the regulations between the U.S. and the EU.

Specific topics to be discussed include: animal welfare, use of veterinary drugs in organic production, GMOs and the avoidance of contamination, and monitoring of conversion practices. The Working Group is also tasked with reviewing instances of non-compliance with organic standards and with conducting a comprehensive review of the agreement by January 2015.

However, since a number of discrepancies between the EU and U.S. organic programs were ignored for the purposes of this agreement, there is a risk of consumer resistance and scandal. For example, if in the future U.S. organic produce marketed with the EU organic logo are revealed to have a GMO content higher than the EU threshold level of 0.09%, this could provoke a political backlash. The Organics Working Group is supposed to help address such potential controversies and to adjust the agreement accordingly, but this is far from an adequate control mechanism to prevent such problems. It seems that both the U.S. and the EU have accepted the risk of potential political problems in the future for the immediate promise of increased organic trade.

Suggested Citation:

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For additional information, the authors recommend:

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Price Premiums for Organic Strawberries

Christine Carroll, Diane Charlton, and Emilia Tjernström

Organic strawberries command a price premium averaging $0.61 per pound at the farmgate and $1.00 per pound at the retail level. Using weekly time series data for the past five years, we find that we cannot explain retail price premiums as a function of farmgate price premiums. This suggests that much of the variation in organic premiums paid by consumers is derived from changes in marketing costs rather than costs of production incurred by the farmers or changes in the supply of organic produce.

Between 2007-2012, the average price for a pound of conventional strawberries was $2.22 and the average price for a pound of organic strawberries was $3.22. This means that the average premium was $1.00 per pound, or 45% over the conventional retail price of strawberries.

Production of organic fruits and vegetables is growing in the United States, and many consumers are willing to pay a substantial price premium because they perceive that organic produce has certain desirable qualities. Much of the economic research on the prices of organic versus conventional produce focuses on the demand side of the produce market and analyzes consumer willingness to pay for organic.

Little existing research examines the extent to which supply side factors and costs of production influence organic price premiums, nor how farmgate price premiums compare to retail premiums. These premiums derive from a number of factors: there may be a limited supply of organic produce relative to the demand, unit production costs for organic farmers are usually higher than for conventional farmers, and processors and marketers may not benefit from the economies of scale that are available in conventional markets..

Identifying the factors that contribute to organic price premiums and differences in premiums between farmgate and retail prices is an initial step to better understanding the nature of the organic produce market—an important and growing niche in U.S. and California agriculture. This article investigates factors that comprise organic price premiums by comparing costs of production, farmgate prices, and retail prices of organic and conventional strawberries. Do differences in the cost of production of organic produce explain the observed differences in the prices of organic and conventional produce? Are the price premiums at the farmgate similar to the price premiums observed at the retail level?

We examine the prices of fresh organic strawberries in California as an example of whether and how price premiums are transmitted from the producer to the consumer. We calculate correlations of farmgate and retail prices for organic and conventional strawberries in California, controlling for seasonality, and we further calculate the correlation of organic price premiums at the farmgate and retail levels.

Price correlations close to one indicate that the farmgate and retail markets move together; correlations far from one, on the other hand, indicate that there may be inefficiencies of arbitrage or high, variable marketing costs incurred between the farmgate and retail levels of sale. We find that the relation between farmgate and retail price premiums is ambiguous, likely because farmgate prices explain little of the variation in retail prices for either organic or conventional strawberries.

Method and Results

We analyze the weekly average shipping point price data and retail price data from the Agricultural Marketing Service (AMS) of the USDA. For many organic fruits and vegetables, the AMS database either does not include organic shipping point prices or the prices are only available for a few weeks each year. Consequently, we focus our analysis on strawberries for which both organic and conventional price data are available for several months of the year. Further, we use shipping point price premiums to represent farmgate prices because they are highly correlated for strawberries.

Various factors often make the data difficult to compare across organic and conventional products, limiting the scope and breadth of analysis. Prices for fresh produce vary substantially depending on weather conditions, season, etc. Also, strawberries are often sold in packages of different weights or berry sizes. We can control for only some of these factors in the comparisons that follow.

At the farmgate level, strawberries are usually sold in flats consisting of a fixed number of containers, each of a certain weight. The most data are available for flats of eight 1-lb containers for the Salinas-Watsonville region of California. Figure 1 shows how farmgate price premiums changed between 2007 and 2012 during the summer months. The gaps represent missing data, primarily for the winter months when berries are supplied from Southern California, elsewhere in the United States, or by imports.

On average, the farmgate premium for organic strawberries is $0.61 per pound. For average conventional prices of $1.11 per pound between 2007 and 2012, this represents a price premium of about 55%. The price premiums of strawberries vary substantially throughout the year, which is consistent with the findings of previous literature.

Jiang and Goodhue find evidence that strawberry promotions play a substantial role in determining the retail price. A seasonal pattern of price premiums is not readily apparent in our data, but seasonal changes in availability of strawberries and other substitutes, along with changes in promotions, likely explain some of the variation in the price premiums that we observe.

For retail prices, we use data collected by the *Fruit and Vegetable Market News*, which surveys more than 200 retailers, consisting of approximately 17,000 individual stores, for their online weekly advertised prices. The majority of the strawberry data are for 1-lb packages. We analyzed prices for the Southwest region of the country for the weeks corresponding to the Salinas-Watsonville price data. The retail price data are the weighted average prices for the stores surveyed for conventional and organic strawberries from 2007 to the present.

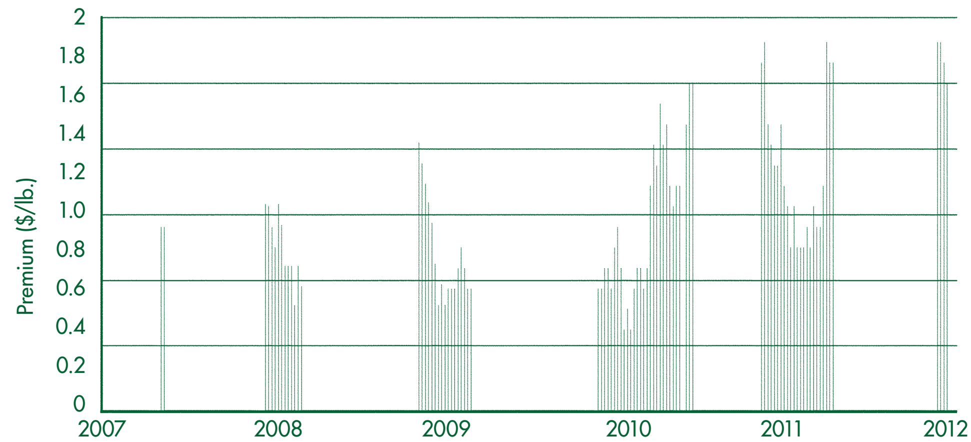
Figure 2 shows the retail price premiums. The average price for a pound of conventional strawberries was $2.22 and the average price for a pound of organic strawberries was $3.22. This means that the average premium was $1.00 per pound, or 45% over the conventional retail price of strawberries.

One explanation for the existence of a price premium is differences in production costs of organic produce versus conventional. Using the calculated cost of production for conventional strawberries in 2010 from the UC Cooperative Extension Cost and Return Studies, we estimate the cost per pound to grow and harvest conventional and organic strawberries.

Organic strawberry fields may yield more than 25% fewer strawberries than their conventional counterparts. As a lower bound for the cost difference, we look at the difference in cost of growing 25% fewer strawberries per acre using the same value of inputs.

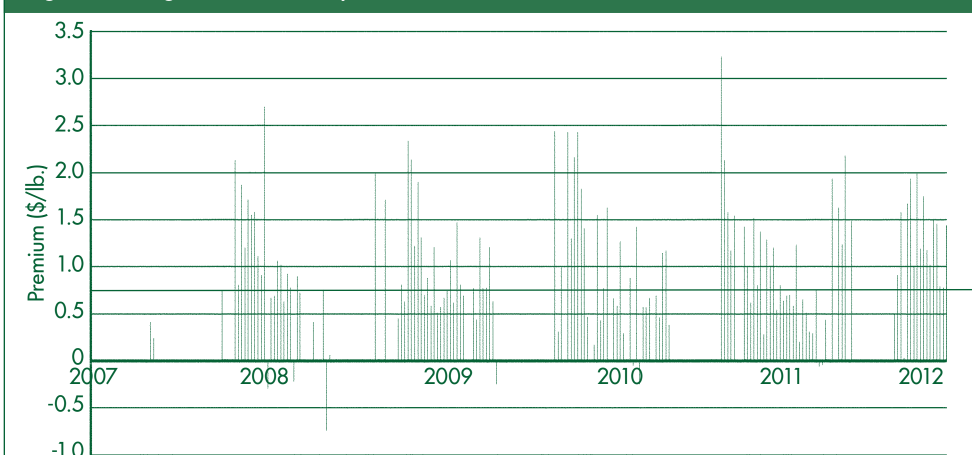
Table 1 shows the estimated cost per pound in 2010 to grow and harvest organic and conventional strawberries, as well as the average farmgate and retail prices in the same year. The price premiums are between 40–45% for both farmgate and retail prices; however, the estimated cost of producing organic strawberries is only 13% higher, using our limited measure. This suggests that production cost differences explain some,

Figure 1. Organic Strawberry Shipping Point Premiums in Salinas-Watsonville, CA



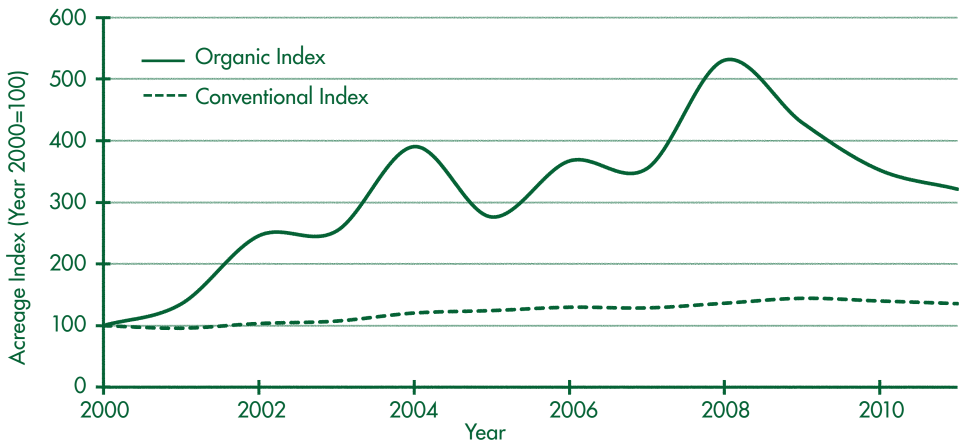
Source: USDA Agricultural Marketing Service

Figure 2. Organic Strawberry Retail Premiums in Southwestern United States



Source: USDA Agricultural Marketing Service

Figure 3. Index of Organic and Conventional Strawberry Acreage in California



Sources: CDFA, California Agricultural Resource Directory, 2011-2012
California Strawberry Commission

but not all, of the price premiums. More complete cost data over several years could clarify this result.

Table 1. Strawberry Costs and Prices, for 2010

	Strawberry Prices ($ per lb)	
	Conventional	Organic
Cost	$0.99	$1.12
Farmgate Price	$1.20	$1.75
Retail Price	$2.30	$3.21

Source: Compiled from USDA AMS
UCCE Cost and Return Studies

Discussion

The correlations between farmgate and retail prices of organic and conventional strawberries provide evidence that there may be little correlation of price premiums. The weekly retail prices of organic and conventional strawberries are only weakly correlated with their respective farmgate prices. In fact, we cannot reject the null hypothesis that the prices have zero correlation. This suggests that farmgate prices have little influence in determining the variation in prices that consumers pay for strawberries.

Consequently, the farmgate price premium likely has little predictive power to explain the premium consumers pay for organic versus conventional strawberries. The sample size in our analysis is not large enough to assess how strong the relationship between farmgate and retail price premiums is, and a longer time series is needed to compare the price premiums directly.

Understanding how retail and farmgate price premiums are related is important for predicting shifts in the supply and demand of organic strawberries. Changes in the price premiums of organic produce are likely to affect the number of farmers and acreage in organic strawberries, imposing a simultaneous relationship between price and supply.

Figure 3 indexes the changes in acres of conventional and organic strawberry fields in California, with 2000 as the base year. In 2000 there were 509 acres of organic strawberry fields and 27,600 acres of conventional strawberry fields. Conventional strawberries have never experienced a change of more than 10% annually. By contrast, organic strawberry acreage, although on an overall upward trend, has fluctuated dramatically.

This study provides evidence that farmgate and retail prices move separately in the markets for both organic and conventional fresh strawberries. Since the farmgate and retail prices for both organic and conventional strawberries are not highly correlated, the premiums are also weakly correlated. The lack of correlation might be due, in part, to changes in the number of farmers and acres growing organic strawberries or changes in advertising and marketing at the retail level.

The finding that retail and farmgate prices of organic and conventional strawberries are not highly correlated suggests that variation in retail marketing has a substantial influence on changes in the retail prices and consequent retail price premiums. Additional research with a longer time series and data on retail price promotions might shed more light on the reasons why retail and farmgate fresh strawberry markets operate distinctly for both conventional and organic berries.

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Faculty Profile: Kevin Novan

Kevin Novan
Assistant Professor
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Kevin Novan has recently joined the faculty at the University of California, Davis as an assistant professor in the Department of Agricultural and Resource Economics. His fields of interest are environmental and natural resource economics, energy economics, applied microeconomics, and industrial organization. Kevin's current research focuses primarily on exploring how policies can mitigate the environmental impacts stemming from generating electricity.

Kevin is a native of Southern California but grew up in Spokane, Washington. As an undergraduate, he attended Western Washington University in Bellingham, Washington where he received his bachelor's degree in Economics and Mathematics. While at Western Washington University, he served as a Teaching Fellow in the Mathematics Department and was chosen as the Outstanding Graduate from the Economics Department.

After completing his undergraduate degree, Kevin began pursuing his Ph.D. in Economics at the University of California, San Diego. While in San Diego, his research and coursework focused on environmental economics and applied microeconomics.

In addition to his participation with the Center for Environmental Economics at UC San Diego, Kevin was selected to study as a Pre-Doctoral Fellow with the Center for Environmental Economics and Sustainability Policy at Arizona State University in Spring 2011.

Kevin received his Ph.D. in March 2012. His dissertation examined the environmental benefits provided by intermittent renewable electricity generation. At the state and federal levels, a variety of policies are driving rapid growth in renewable electricity generation. While these policies are motivated by the belief that renewable electricity will reduce pollution, the actual effect on emissions is unknown.

Combining data on electricity generation and emissions, Kevin's research identified the emissions reductions caused by output from wind turbines in the Texas electricity market. His findings revealed that significant reductions in pollution are provided by the renewable output.

Furthermore, his research shed light on key inefficiencies inherent in current renewable energy policies. In addition to his work exploring the environmental benefits of renewable electricity, Kevin's previous research also examined the impact of electricity storage technologies on pollution as well as the effect of gasoline taxes on government revenue and price volatility.

Extending the work from his dissertation, Kevin is currently analyzing the impact of renewable electricity on ambient air quality and the resulting health effects. Additionally, his new projects are studying the positive and negative interactions between policies intended to reduce pollution from the electricity sector as well as the potential energy savings that can be realized by subsidizing energy efficiency.

In addition to his research and teaching interests, Kevin is a lifelong tennis player and golfer. During his time in San Diego, he also took up both surfing and bicycle touring; most recently spending a month biking down the Pacific Coast from Seattle, WA to Southern California.

After finishing his Ph.D., Kevin and his wife Samantha spent their summer as newlyweds on a cross country road trip, visiting as many national parks and micro-breweries as they could find. During their spare time, Kevin and Samantha enjoy working on fine-tuning their culinary skills and spending long weekends with their families in Hayden Lake, Idaho and Northwest Arkansas.

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