

The Genetically Engineered Foods Mandatory Labeling Initiative

Overview of Anticipated Impacts and
Estimated Costs to Consumers

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July 25, 2012

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Executive Summary

The Genetically Engineered Foods Mandatory Labeling Initiative (A.G. File No. 11-0099 – hereinafter the Initiative) would have a substantial impact on California consumers. The Initiative would change how many of the foods they eat are produced and would make that food more expensive. At the same time, however, the Initiative would provide relatively little by way of consistent and useful information to consumers because of the loopholes and exceptions in its language and the uneven ways in which it would apply to the same food consumed in different settings.

The key provisions of the Initiative require that foods purchased for at-home consumption must be labeled “Partially Produced with Genetic Engineering” or “May be Partially Produced with Genetic Engineering” if the food contains at least 0.5 percent (by weight) of a genetically modified ingredient. The threshold level drops to 0 percent in 2019. The Initiative also bars the use of the word “natural” in packaging or advertisements for virtually all foods, regardless of whether they include genetically engineered ingredients.

The Initiative contains many exemptions, creating a patchwork of labeling requirements for foods in which some foods consumed at home might require a label, but the same food eaten in a restaurant would not. Under the Initiative, the following are exempt from labeling, *regardless of whether or not they contain genetically engineered (GE) ingredients*:

- Foods certified as organic;
- Foods consisting of or derived entirely from animals, regardless of whether the animal has been fed GE feed or injected with GE drugs;
- Alcoholic beverages;
- Foods eaten away from home; and
- Food made using GE processing aids or enzymes.

The wide range of exemptions means that consumers could still purchase and consume a wide range of foods made from or containing GE ingredients, but that would not be subject to labeling under the Initiative. The potential therefore exists for bizarre inconsistencies where identical products consumed at home and in a school cafeteria would be required to have a label in the first instance, but not in the second. The way in which the Initiative is drafted opens the possibility for a wide range of absurd outcomes regarding what is and is not subject to labeling.

Scope of this Report

Our report is focused on quantifying the potential cost of this ballot Initiative to California consumers. In Chapter 1, we analyze food expenditure and consumption data to understand the scope of foods subject to the Initiative, given the broad range of exemptions. While the Initiative

would likely apply to about one-third of food purchased by Californians (*i.e.*, those foods that are not exempt and may contain GE ingredients), those affected products likely represent at least 100,000 food items.

In Chapter 2, we discuss broadly the main costs and impacts that this Initiative could have on consumers and producers and in Chapter 3 review some of the data compiled in past research on the potential costs and impacts of similar requirements. Finally, in Chapter 4, we develop several scenarios for compliance with the Initiative and then combine the available data on food subject to labeling with our assumptions about compliance and the available cost data to project cost impacts to California households. To provide additional context, the report's Introduction includes an analysis of the provisions of the Initiative, with an emphasis on those provisions likely to impose economic impacts and a comparison of the Initiative with related laws around the world.

Scope of the Initiative (Chapter 1)

The Initiative includes an extensive list of exemptions and conditions for exemption whereby certain foods or categories of food would be excused from GE labeling requirements, even though the food might still contain GE ingredients. The range of exemptions calls into question whether the information conveyed by the required labels would be meaningful to consumers, since they could purchase unlabeled foods that contain GE ingredients or consume products containing GE ingredients at restaurants and cafeterias.

To further confuse matters, our analysis indicates that a substantial majority of foods purchased by Californians may be exempt from labeling, regardless of whether those foods contain GE ingredients. This large loophole in the Initiative casts doubt on the benefit of imposing these costly mandates on the food industry, since consumers stand to gain little in the way of useful information from the Initiative's requirements.

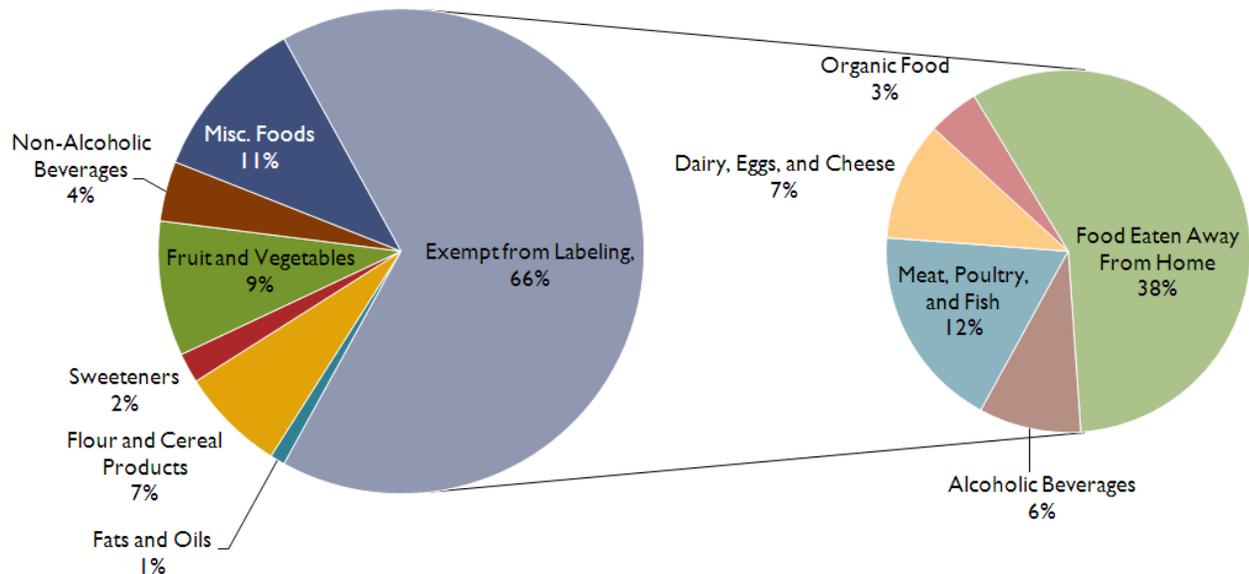
Using federal government data on food expenditures and the definitions in the Initiative, we determined that 34 percent of food expenditures remain subject to the provisions in the Initiative, after adjustment for all the exemptions (Figure ES-1). The major exemptions – food consumed away from home, alcoholic beverages, and for meats, fish, poultry, dairy, and cheeses – mean that two-thirds of the food Californians buy would not be subject to labeling, even if some of those foods contained GE ingredients, were produced from animals fed GE feed, or were manufactured using GE processing agents. This figure is consistent with estimates by the Grocery Manufacturers Association that 70 percent of food on grocery shelves would contain GE ingredients, when foods eaten away from home and alcohol are added to the equation.

Such broad exemptions still leave room for a wide variety of foods and beverages to be affected by the Initiative. In fact, most products available in a supermarket are not exempt. These foods and beverages range from microwave dinners to sauces to canned fruit. In fact, other than many of the items in the produce aisle and some items in the dairy and meat aisles, most other foods and beverages in a California store would not be exempt from this Initiative. We estimate that

over 200 food and beverage types in an average supermarket would be affected by the Initiative, with each category consisting of numerous brands and varieties.

Figure ES-1

66 Percent of Food Expenditures are Potentially Exempt from the Initiative’s Labeling Requirement
(2009 Data)



Anticipated Costs (Chapters 2 through 4)

Despite the various loopholes and exemptions created by the Initiative, its provisions would still force significant changes to a substantial part of the food supply in California. In order to translate those changes into economic impacts to California consumers, we first had to consider how the Initiative would affect retailers and food producers, who would be faced with decisions about how to bring tens of thousands of products into compliance with the Initiative.

We caution that predicting the response of the entire global food supply to these requirements requires many generalizations and simplifications. Almost no country with GE labeling requirements has ever contemplated thresholds for GE ingredients as low as 0.5 percent and they do not appear to have considered 0 percent thresholds as practically achievable.^{a,b} Yet, those are the limits that are included in the California Initiative. Therefore, experience in other countries and even research done previously in the US, which assumed much higher thresholds, are of limited assistance in guiding us to understand if such levels could be met and, if so, at what cost.

^a Notably, the organic food industry, which is a primary sponsor of the Initiative, has argued against having its products held to a 0 percent threshold for the presence of GE material because of the practical challenges (or impossibility) of achieving it.

^b China and Malaysia have zero thresholds for labeling foods containing GE ingredients, although we are unclear as to the extent to which they are enforced.

Cost Scenarios

Based on experience in other parts of the world, review of the literature, and discussions with academic and business experts, we believe the most likely means of compliance for food companies is to substitute other ingredients for GE ingredients in their products. This means that companies would change the way in which they source ingredients or manufacture their products in order to avoid labeling their products with a vague and potentially frightening warning that conveys little meaningful information.

We developed two different substitution scenarios for affected foods – both of which would be extremely costly and time-consuming to implement. We also considered an option where foods containing GE ingredients were not altered, but were labeled as such as required in the Initiative. Based on conversations with industry experts, we believe it is likely that food producers would employ a combination of approaches:

- **Scenario 1: Substitution with organic ingredients.** In this scenario, we assumed that GE ingredients would be replaced with their organic counterparts. This may not be feasible as a means of compliance for all products (*i.e.*, supply of organic inputs may be limited or unavailable, especially by the 2014 compliance date).
- **Scenario 2: Substitution with certified non-GE ingredients.** Producers could also obtain non-GE versions of at least some of the GE ingredients they use today. While such crops are grown in the US today, most are exported and none are held to the very low GE material threshold of 0.5 percent established beginning in 2014. Farmers and producers would face significant challenges providing sufficient certified non-GE crops by the 2014 compliance date.

For comparison purposes, we also examined a scenario (Scenario 3) in which non-GE ingredients were substituted for GE ingredients, but we used existing literature summarizing prior research on the costs of this approach. These studies are typically quite dated and assumed compliance with much higher thresholds (*i.e.*, allowable levels of GE ingredients of one to as much as five percent), not the 0.5 percent threshold that would take effect in California in 2014.

We also conducted a limited assessment of the costs of the Initiative's provision restricting the use of the term "natural" on food labels and advertising (Scenario 4). Since "natural" claims and attributes are extremely common among foods, the impact of banning these products and claims would have a far-reaching impact on many producers. A complete analysis of this provision was outside the scope of this analysis; we considered only costs from labeling changes, but not some of the more far-reaching impacts such as developing new marketing and branding campaigns and legal costs. Under a regulatory regime where simply freezing a food renders it illegal to claim the food as "natural," the opportunities for violations and bounty-hunter suits are abundant.

Finally, we considered a compliance option in which producers do not substitute for GE ingredients, but simply label their products as required by the Initiative. This labeling approach avoids the need to modify the ingredients, to test the foods for GE ingredients, or to defend

against bounty-hunter lawsuits. We do not believe, however, that this option would be viable for more than a very small sample of products because of its devastating marketplace impact.

In fact, an outright ban of GE foods is the publicly stated goal of the proponents of the Initiative. The Director of the Organic Consumers Association, which is a principal funder of the Initiative, has said that, “If we pass this initiative...we will be on our way to getting GE-tainted foods out of our nation’s food supply for good.”¹ The label has also been referred to as being equivalent to a “skull and crossbones.”² As one would expect, producers elsewhere have avoided this option because of concern over adverse consumer reaction.

Cost Estimates for Substitution Scenarios

The most likely compliance scenarios carry very high price tags for California consumers. Scenarios 1 and 2 result in mid-point cost estimates of roughly \$350 to \$400 per California household, implying that the average households’ food and beverage spending would have to rise 2.7 to 3.1 percent to cover the costs of replacing GE ingredients in their food (Figure ES-2). We believe that the assumptions used to develop these estimates lead to conservatively low compliance cost figures.

The use of organic ingredients (Scenario 1) is generally more costly because of the very high price premiums for these inputs to foods. While certified non-GE ingredients could also be substituted (Scenario 2), the true costs of segregating these ingredients from GE crops are very difficult to estimate. The broad range of costs under this scenario reflects this uncertainty, but we are concerned that the true costs of this approach might be even higher because of the lack of experience with guaranteeing that the presence of GE material stays below the proposed 0.5 percent threshold – a threshold that many experts believe will be very difficult to achieve. Because these substitution costs do not reflect actual experience with such low thresholds, we believe we have likely underestimated compliance costs somewhat. We also note that this Scenario would not be practical for compliance after the proposed 0 percent threshold becomes effective in 2019. At this point, substitution with non-GE ingredients would no longer be feasible, as confirming 0 percent GE is not possible even with the most sophisticated identity preservation and testing methods.

Figure ES – 2

Summary of Compliance Costs per Household (\$)



Source: Northbridge Analysis – See Chapter 4

In addition to considering cost impacts at the per-household level, we also computed aggregate compliance costs for the Initiative. Our cost estimates are summarized in Figure ES-3. In addition to showing the per-household costs (as ranges and mid-points of the range), we also computed the impact that these higher costs would have on household food budgets. These percentage increases are computed across all spending on food and beverages by households, even though the labeling provisions only apply to foods consumed at home. The percentage increase in *at-home* food spending would be nearly double the levels shown in the table (*i.e.*, a 3 percent increase in total food spending would equate to a 6 percent increase in spending on food consumed at home).

Finally, we computed costs on a state-wide basis, aggregating consumer costs across all households. The total annual consumer cost to pay for the changes made to the food supply by the Initiative range from \$4.5 to \$5.2 billion. Given the conservative nature of our substitution cost assumptions, we believe it is more likely that true costs will fall toward the upper ends of the ranges provided.

Figure ES – 3

**Summary of Compliance Cost Scenarios –
Substituting for GE Ingredients**

	Cost per California Household per Year	Increase in Household Food Spending	Statewide Annual Costs (\$ billions)
Scenario 1: Substitute GE ingredient with organics	\$401 (\$267 - \$535)	3.1% (2.0% - 4.1%)	\$5.2 billion (\$3.5 - \$7.0)
Scenario 2: Substitute GE ingredient with non-GE	\$348 (\$123 - \$572)	2.7% (0.9% - 4.4%)	\$4.5 billion (\$1.6 - \$7.4)

Source: Northbridge analysis – see Chapter 4

Other Costs

We conducted only a limited analysis of the impact of the sweeping prohibition on the use of the term “natural” on food products and advertising (Scenario 4). According to the most recent USDA data 8.4 percent of new products introduced into the marketplace in 2009 were tagged as “natural.” In fact “natural” has ranked among the top ten advertisement claims since 2001. We calculated that in the California marketplace, at least 25,000 wide-ranging products would be touted as “natural.” We estimated that the cost of relabeling affected products would total \$33 to \$93 million statewide. These are one-time costs. If these costs are amortized over several years, the annualized cost to California consumers would range from \$8 million to \$23 million.

It is important to note that, although the cost of removing “natural” from labels is only an annualized added household cost of \$1 to \$2 for Californians, this cost would pale in comparison to the cost of customizing advertising campaigns and rebranding “natural” foods for a California-specific market. It was beyond the scope of this analysis to quantify the full costs of rebranding the affected products, but it is evident that that would be significantly more costly than just changing the labels. In addition, we cannot predict how removing the “natural” tag from marketing campaigns would adversely impact product sales, especially concerning those companies and products with “natural” (or similar words and terms) in their names.

The final scenario we considered was one in which producers choose to label foods with the required GE labeling. We estimated costs based on analysis of other mandated labeling changes. Note that in this scenario, no further compliance costs are borne by the producer, but there may be significant market impacts from the decision as consumers choose to avoid these products, despite the fact that consumers may be eating the same ingredients in products exempt from labeling. We therefore do not believe this is a viable scenario for the vast majority of affected products. Even the costs of labeling alone are significant, however, with one-time costs of \$300 million to \$800 million statewide.

Limitations of the Cost Analysis

- The cost estimates only capture likely compliance costs over the short to medium-term – between the date of enactment and 2019 when a zero percent threshold goes into effect for GE ingredients in selected foods.
- Longer-term impacts on the food supply are very difficult to predict at this time. We would expect that food companies would:
 - Make greater use of organic inputs to take advantage of the organic exemption; that is certainly the hope of the organic food industry, which is strongly supporting the Initiative’s passage.
 - Reformulate some foods to shift away from ingredients with GE characteristics (*e.g.*, substitute palm oil for corn oil), but determining the cost impacts of those reformulations is beyond our ability to predict.

- The significant impacts that GE crops have had on lowering pesticide use, improving yields, and making farming more profitable for farmers would likely dissipate. This would have significant economic and environmental implications that are not considered here.
- Analysis of the full impact of the prohibition on the word “natural” associated with a wide range of processed foods is not within the scope of the analysis.
- Impacts on California farmers are not identified specifically in this analysis.
- Legal costs associated with defending products and companies against bounty-hunter lawsuits are highly uncertain and likely to be significant. We have included paperwork and tracking costs under Scenario 2 to create paper trails to document the use of non-GE ingredients, but these costs do not capture the highly uncertain and potentially enormous costs of litigation.
- Government compliance costs are not included in our analysis. The costs to enforce this complex and unprecedented legislation would place a significant burden on the state from development of regulations to enforcement.
- Transportation costs throughout the supply chain are not included in our analysis. Dedicated transportation or clean-up procedures for trucks, rail and wagons transporting non-GE ingredients and foods will likely be needed. This will require substantial expenditures in transportation and storage infrastructure and/or extensive cleaning of these facilities between shipments.
- The costs and limitations of testing are not included in our analysis, and could add substantial costs to the implementation of this Initiative. The most sensitive tests can detect GE presence at a 0.01 percent threshold, but quantitatively identify GE presence at 0.1 percent or higher. These thresholds can also vary from lab to lab, and the ingredients and foods would require to be tested – often multiple times – at every step of the supply chain. There are no tests at this time that could confirm 0 percent GE presence, as would be required by the Initiative to avoid labeling of non-exempt foods in 2019.
- We only addressed the potential impacts related to food and beverages for human consumption, though the Initiative appears to apply to pet foods as well. If so, we would expect significant cost impacts to pet food manufacturers and California pet owners.

Introduction

The Genetically Engineered Foods Mandatory Labeling Initiative (A.G. File No. 11-0099 – hereinafter the Initiative) would have a substantial impact on California consumers. The Initiative would change how many of the foods they eat are produced and would make that food more expensive. At the same time, however, the Initiative would provide relative little by way of consistent and useful information to consumers because of the loopholes and exceptions in its language and the uneven ways in which it would apply to the same food consumed in different settings.

The Initiative would also profoundly affect those in the food supply chain – from those that supply seeds to farmers, grain elevators, transportation companies, food processors and manufacturers, wholesalers and brokers, and retailers of all types. The higher food prices ultimately borne by consumers in California would result from higher costs throughout the supply chain, brought about by the provisions of the Initiative.

Initiative Provisions and Discussion

The Initiative is a somewhat complicated set of definitions and requirements, overlaid by a series of exemptions and special conditions that make it challenging to identify which products would be subject to the labeling requirements and which would not. We have summarized the key provisions to provide context for our analysis and the discussion that follows in this report. The Initiative would require labels for food and beverages purchased for home consumption if they are “or may have been entirely or partially produced” with genetic engineering. In practical terms this means:

- Foods and beverages containing at least 0.5 percent (by weight) of a genetically modified ingredient (0 percent after 2019) would require a label indicating that the product was “Partially Produced with Genetic Engineering” or “May be Partially Produced with Genetic Engineering” and
- For raw agricultural commodities (*e.g.*, those that are not frozen or canned) that the package contain the words “Genetically Engineered” or, if not packaged, that shelves or bins on which those foods are stored have the same sign.

Several exemptions apply to the proposed Initiative. Based on the Initiative, none of the following foods would require labeling, regardless of whether they contained genetically engineered (GE) ingredients:

- Foods certified as organic (this exemption applies even if the foods include GE material);
- Foods consisting of or derived entirely from animals (again this applies even if the animals were fed GE feed or injected with GE drugs);
- Food made using GE processing aids or enzymes;

- Beverages containing 0.5 percent or higher alcohol content (regardless of whether grains or processing agents used were GE); and
- Foods eaten in a restaurant or other “food facility” (regardless of GE content in those foods).^c

The Initiative also prohibits the use of the word “natural” (or similar words) in packaging or advertisements for processed foods. This unprecedented restriction is extremely broad^d and may cause some companies to have to rebrand a significant number of products simply because they are minimally processed (*i.e.*, canned or frozen) and therefore subject to this prohibition.

Discussion

From the perspective of our analysis of costs and impacts to consumers, we are most concerned with the Initiative provisions that affect which products are subject to labeling (*i.e.*, are not exempt) and the features of the Initiative that would impose costs on the food supply and delivery system from farm to table.

Products Subject to Labeling

The foods subject to labeling are addressed in Chapter 1 of our report. Because of the scope and complexity of the exemptions, we have focused our attention on them to attempt to determine what foods would ultimately be subject to the labeling requirements if they contained GE ingredients.

- By excluding alcoholic beverages and foods eaten away from home, the Initiative takes a large portion of consumers’ food intake “off the table.” This is seemingly at odds with the Initiative’s stated purpose of providing information to consumers about what they eat and drink.
- Other significant categories of exclusions include organic foods and all meat, fish, and dairy products; the exemption for foods produced using GE enzymes or processing agents effectively removes all cheese from the scope of the Initiative as well.

These broad exemptions call into question whether the Initiative would result in useful or meaningful information to consumers. This concern is all the more serious when one considers that the Initiative does not provide exemptions because the items are free of GE material. In fact, many of the exempt items are known to include GE ingredients or to be produced using genetic

^c A food facility, where food is exempt from labeling regardless of its GE content, includes an operation that stores, prepares, packages, serves, or otherwise provides food for human consumption at the retail level, including, but not limited to, storage facilities for food-related utensils, equipment, and materials; school cafeterias; licensed health care facilities; commissaries; mobile food facilities; farmers markets.

^d Processed food is defined very broadly and includes any food other than a raw agricultural commodity that has been subject to processing such as canning, smoking, pressing, cooking, freezing, dehydration, fermentation or milling.

engineering. Rather than meeting its objective of informing consumers, it appears that the Initiative confuses consumers through an arbitrary set of exemptions.

The exemption for organic products also appears arbitrary and likely to be confusing to consumers. Organic products may contain some GE ingredients – not deliberately, but through means such as pollen drift between fields or inadvertent comingling through shared use of processing equipment or storage facilities. For this reason, European Union policies explicitly allow up to 0.9 percent GE content in organic foods. Though the EU and US adopted an Organic Equivalence Cooperation Arrangement in February 2012, the US does not recognize a formal threshold for GE content in organic foods

With organics as with food away from home, meats, dairy products, and cheeses, the absence of a label does not mean the food is below the GE ingredient threshold; it means that the authors of the Initiative apparently believe that the GE content in exempt foods is irrelevant. We view this as a serious limitation of the effectiveness of the Initiative in conveying meaningful and useful information to consumers.

The Initiative is Extreme Compared to the Rest of the World

Many countries require some kind of labeling of GE foods, but the standards, definitions, and exemptions vary widely. It is clear, however, that none of those regulatory programs have as stringent a threshold on GE ingredients as the one proposed in the Initiative.^e

The largest markets requiring labeling of foods containing GE ingredients are the European Union and Japan. As noted, the EU allows up to 0.9 percent of GE ingredients without requiring a label, while Japan has a five percent threshold. The California Initiative sets an initial threshold of 0.5 percent in 2014 and drops the threshold to 0 in 2019. The practical and cost implications of those targets are addressed in our report.

Cost Implications

Once we have determined which foods are subject to labeling (*i.e.*, do not fall under one of the many exemptions), we reviewed existing research and data to develop cost estimates for compliance. In Chapter 2, we discuss broadly the main costs and impacts that the Initiative would have on consumers and producers, and in Chapter 3, we introduce some of the data and research available to assess these costs. While prior analyses identify how the food supply system needs to make adjustments for a labeling requirement, the extent and cost of those adjustments is largely understated given that the Initiative's thresholds are much more stringent than those considered in the past. In Chapter 4, therefore, we integrate the available data on food subject to labeling with our assumptions about compliance and with more current, available cost data to project potential cost impacts on California households.

This analysis is limited to considering the costs in the supply chain from farm to table. The Initiative imposes other costs – legal and government enforcement costs most notably – as well

^e China and Malaysia have zero thresholds for labeling foods containing GE ingredients, although we are unclear as to the extent to which they are enforced.

as specific impacts on California growers and food companies that we have not considered. We have identified these as limitations to our analysis and should be quantified to document the full economic impact of the Initiative.

1. Scope of the Initiative

Summary

The Initiative includes an extensive list of exemptions and conditions for exemption whereby certain foods or categories of food would be excused from GE labeling requirements, even though the food might still contain GE ingredients. The range of exemptions calls into question whether the information conveyed by the required labels would be meaningful to consumers, since they could purchase unlabeled foods that contain GE ingredients or consume products containing GE ingredients at restaurants and cafeterias.

If the scope of the exemptions were limited, this confusion would not be problematic, but our analysis indicates that a substantial majority of foods purchased by Californians may be exempt from labeling, regardless of whether those foods contain GE ingredients. This large loophole in the Initiative casts doubt on the benefit of imposing these costly mandates on the food industry, since consumers stand to gain little in the way of useful information from the Initiative's requirements.

Despite these broad exemptions, the types and number of products subject to labeling are still extensive, extending to perhaps 100,000 items sold in stores in California.

Analysis

Public data on food and beverage consumption is available from the US Department of Agriculture (USDA), the Bureau of Labor Statistics (BLS), and industry trade associations. We analyzed the data to determine which categories of food could be exempt from labeling because they met one or more of the following criteria:

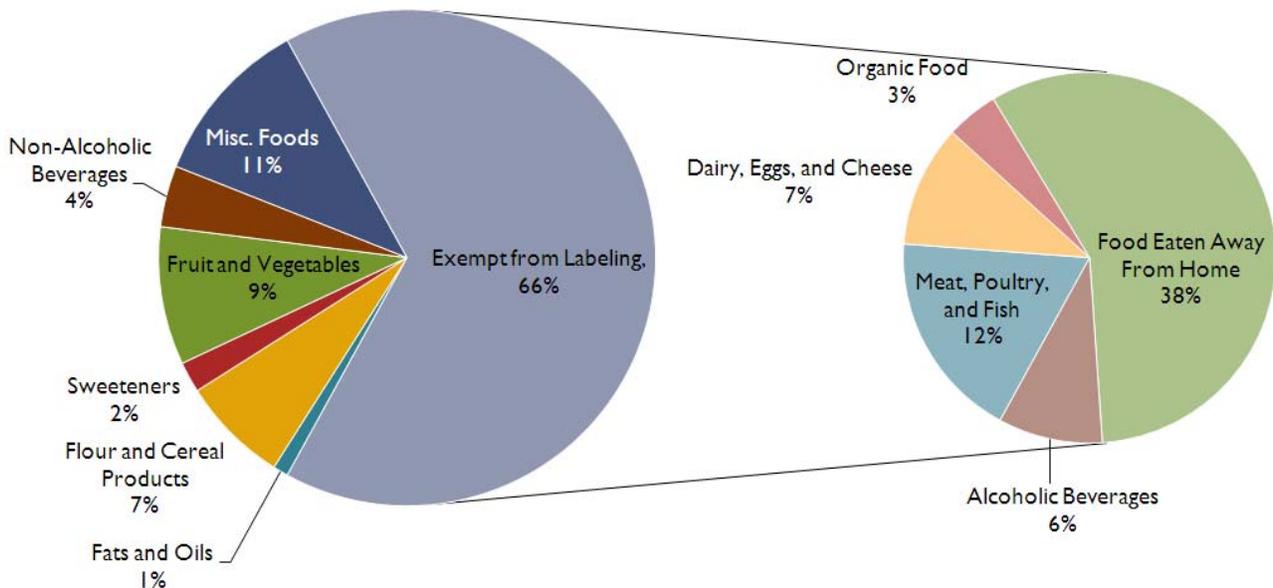
- Meat, poultry, seafood;
- Dairy (including milk, eggs, butter, cheese, but excluding processed dairy, such as chocolate milk);
- Alcohol;
- Food made using GE processing aids or enzymes;
- Food meeting USDA's definition as "Organic"; and
- Food eaten away from home.

The research found that for every dollar of food purchased, 66 cents went towards foods that would automatically be exempt from labeling. Put another way, of the approximately \$4,520 that the USDA estimated each American spent on food in 2010, only \$1,537 of it would have been required to show whether or not it contained GE ingredients.

Figure 1-1 illustrates the food and beverage categories that would likely be subject to labeling as containing genetically engineered ingredients based on the Initiative versus those foods that would probably be exempt from labeling based on the average American’s food expenditure in dollars.³ It is worth noting that the data collected by the Bureau of Labor Statistics is commodity-based, and it does not provide data on how the food is prepared. In addition, it uses broader categories than the USDA data available on a weight basis. As a result, all of the dairy consumption, for example, is considered exempt, while there are likely foods included in that category that would require labeling, such as sweetened yogurt. Furthermore, data on processed foods, which may contain several ingredients, are not available in a way that could be used for this analysis. As a result of these two factors, the percentage of exempt foods may be overstated.

Figure 1-1

66 Percent of Food Expenditures are Potentially Exempt from the Initiative’s Labeling Requirement
(2009 Data)



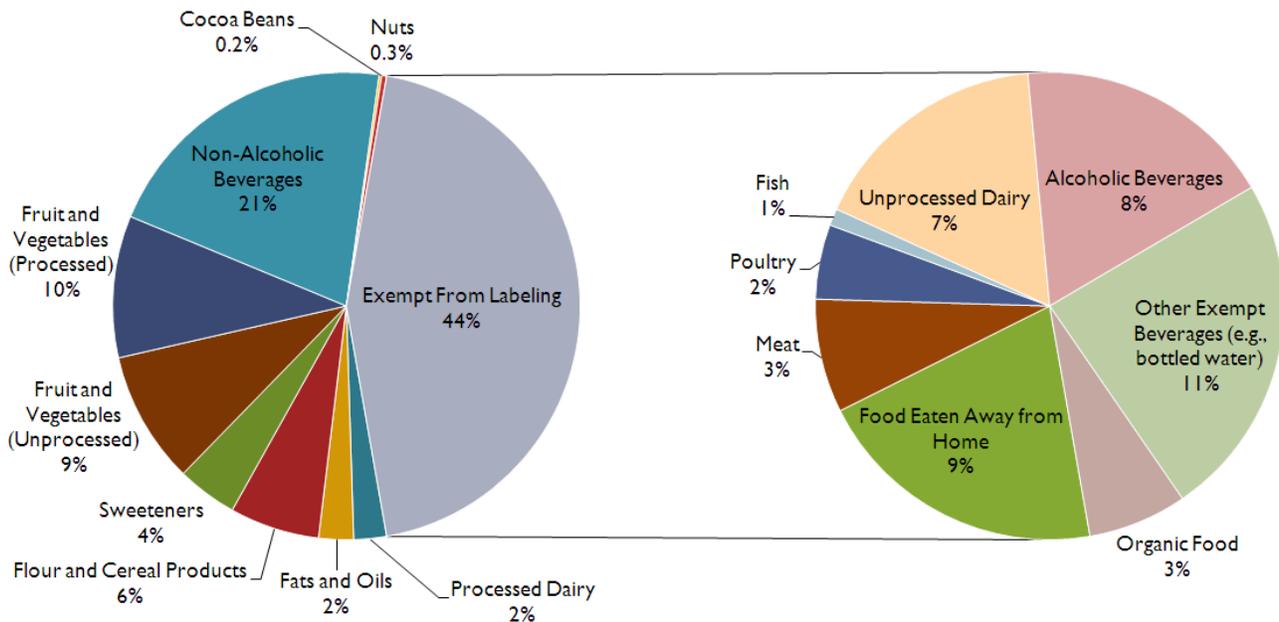
In 2000, the Grocery Manufacturers Association estimated that 70 percent of the food on grocery shelves contained GE ingredients. Assuming that this would roughly correlate to the same percentage of expenditures on foods purchased in a grocery store, when combined with alcohol purchases and food eaten away from home, we calculate that approximately 36 percent of all food purchased would be potentially covered by the Initiative. While this is a much less detailed approach, it is close to our 34 percent figure and verifies that it is reasonable.

We also analyzed the impact of exemptions based on the quantity (weight) of food consumed. On a weight basis, the data collected by the USDA shows that as much as 45 percent of food would automatically be exempt from labeling.⁴ Figure 1-2 illustrates the food and beverage categories that would be exempt from labeling, as well as those that may require labeling.

Figure 1-2

45 Percent of Food Purchased (Weight Basis) Could be Exempt from the Initiative's Labeling Requirement

(2009 Data)



Similar to the expenditure information in Figure 1, the data provided by the USDA is on a commodity basis and does not account for foods that are a combination of these commodities, such as frozen meals or cans of soup. As a result, the percentages of exempt foods (on a weight basis) derived from these calculations may be higher than the reality.

Types of Products Potentially Subject to Labeling

Despite these broad exemptions, the types and number of products subject to labeling are still extensive. Commonly used GE ingredients include corn products such as flour, oil, starch, and syrup; sweeteners such as fructose, dextrose, and glucose; soy flour and protein; vegetable oil and vegetable protein; canola oil; and beet sugar. These ingredients can be found in a large majority of the foods found at a supermarket, meaning that any foods for at home consumption with more than 0.5 percent of any or a combination of these ingredients would be affected by the Initiative. Some of the foods affected are listed below and the variety and number of foods listed illustrates the widespread impact of the Initiative. This list includes many of the foods or categories that would be affected by the Initiative, but is certainly not an exhaustive record. We estimate that more than 100,000 products would likely be subject to the labeling requirements under this Initiative.

Beverages

Baby formula
Instant coffee mixes & bottled drinks
Coffee creamers & syrups
Hot cocoa
Hot cider mix
Chocolate milk
Chocolate & strawberry syrup
Iced tea mixes & bottled drinks
Bottled iced tea & coffee drinks
Fruit punch
Lemonade
Cranberry juice
Orange drink
Apple juice
Cola
Ginger ale
Citrus soda
Orange soda
Root beer
Berry soda
Energy drinks
Sports drinks
Enhanced/flavored water

Bread & Bakery

Cookies
Cupcakes
Fruit pies
Sweet breads & bagels
Coffee cake
Doughnuts
Muffins
Pastries
Corn bread
Hot dog & hamburger buns

Breakfast & Cereal

Breakfast bars
Instant breakfast drinks
French toast (frozen)
Waffles (frozen)
Pancakes (frozen)
Frozen sausages
Breakfast sandwiches
Vegetarian sausage & bacon

Frozen breakfast meals
Breakfast cereals & granola
Instant oatmeal & grits
Sweetened hot cereals
Toaster pastries
Syrup

Canned Goods & Soups

Canned fruit
Cranberry sauce
Apple sauce
Canned corn
Canned vegetables
Canned meat
Canned chili
Canned soups & stews
Corned beef hash
Microwave meals
Sloppy joe mix
Canned pasta dishes
Instant soup
Ramen noodles
Baked beans
Stocks & broth

Condiments, Spices & Baking

Cake mix
Brownie & bar mix
Muffin mix
Sweetened gelatin
Pancake & waffle mix
Puddings & custards
Pie filling
Pastry shells
Cookie mix
Bread mix
Baking chips
Corn meal & polenta
Marshmallows & fluff
Condensed milk
Sugar
Corn syrup
Sweeteners
Decorative icing & frosting
Sundae toppings
Sprinkles

Ice cream cones
Ketchup
Mayonnaise
Mustard
Canola oil
Cooking sprays
Shortening
Vegetable oil
Honey
Jams & jelly
Peanut butter
Relish
Pickles
Shake & bake coatings
Taco mix
Pasta sauce mix
Dip mixes
Salad dressing
Croutons & salad toppings
Dressing mix
Sauces & marinades
Seasoning mixes
Barbecue sauce
Dipping sauce
Gravy & glazes
Hot sauce
Marinades
Meat & steak sauce
Seafood sauces

Cookies, Snacks & Candy

Candy bars
Gum
Gummi candy
Hard candy
Jelly beans
Licorice
Mints
Nut/caramel/fruit candy
Chocolates
Cheese snacks
Corn chips
Grain cakes
Multigrain chips
Pork rinds
Potato chips

Tortilla chips
Chocolate chip cookies
Cookies
Fruit filled cookies
Oatmeal cookies
Sandwich cookies
Other cookies
Cheese crackers
Classic crackers
Deli Style crackers
Graham crackers
Party mixes
Saltines
Wheat crackers
Premade dips & spreads
Veggie dips
Fruit snacks
Jerky
Corn nuts
Trail mixes w/ chocolate
Microwave popcorn
Granola bars
Flavored pretzels
Covered pretzels
Ready-to-eat gelatin

Dairy, eggs & cheese

Margarine
Low fat & flavored cottage cheese
Flavored cream cheese
Processed cheese
Flavored milk
Milk substitute
Non-dairy creamers
Soy milk
Whipped cream
Ready-to-eat pudding
Yogurt
Yogurt drinks
Soy yogurt

Deli

Packaged salads
Side dishes
Sandwiches
Soups

Cold cuts

Frozen foods

Appetizers
Breads & rolls
Frozen pastry dough
Pies
Cakes
Pastries
Frozen dinners
Juice
Pasta
Pasta sauce
Frozen pizza
Ice cream
Popsicles
Sandwiches
Toppings
Veggie burgers
Vegetables & sauces
Tater tots
Onion rings
French fries
Burritos

Fruits & Vegetables

Papayas
Squash
Tofu
Meat alternatives

Grains, Pasta & Sides

Beef dishes
Poultry dishes
Seafood dishes
Boxed salad mixes
Couscous dishes
Pasta sauce
Macaroni & cheese
Pasta mixes
Potato mixes
Rice mixes
Stuffing

International cuisine

Asian noodle dishes
Asian rice dishes
Asian sauces
Asian snacks
Asian soups
Salsas & dips
Taco kits
Refried beans
Sauces & marinades
Tortillas
Tacos

Meat & Seafood

Prepared & frozen meals
Beef
Chicken
Pork
Seafood
Turkey

2. Discussion of the Potential Cost to Consumers, Farmers and Manufacturers of GE Food Labeling

The Initiative would have a sweeping impact on the entire food industry in California and nationwide. Higher costs would be felt by farmers, grain handlers, food manufacturers and retailers, all of which would result in higher costs to consumers. Our study estimates that the Initiative could cost California households between \$350 and \$400 per year, with a total annual consumer cost statewide of \$4.5 to \$5.2 billion (Chapter 4).

Determining all of the costs stemming from this proposal would be a vast undertaking and a highly uncertain one. The scope of potential litigation, for example, cannot be known until farmers, food producers, and retailers determine a compliance strategy and the bounty-hunter attorneys develop their counterplan of lawsuits. Legal costs alone could dwarf all other costs resulting from this Initiative.

Because of this uncertainty, we have focused our efforts on the impact of the Initiative on the food supply – the cost of producing, storing, distributing, manufacturing, and selling food under the requirements of the Initiative. The provisions of the Initiative go far beyond what almost any other country has imposed previously. In this Chapter we discuss the practical impacts for those who supply food to Californians and then in Chapter 3 discuss the research and data available for quantifying these costs and impacts. Finally, in Chapter 4, we integrate our findings to compute estimates of the costs likely to be borne by California consumers as a result of the Initiative.

Seed Producers

At this time, there are nine approved GE crops currently grown and sold in the US: corn, sweet corn, soybeans, canola, cotton, sugar beets, alfalfa, squash, and papaya. Seed producers would be first entities affected by the Initiative. The seed firms will have to go to great lengths to ensure that their non-GE seeds satisfy the 0.5 percent threshold mandated by the Initiative.

Seed producers can expect their costs to increase substantially from:

- Setting aside land and going through other efforts to isolate non-GE breeds from their GE counterparts as the seeds are being developed to avoid pollen flow. This is especially the case for crops that cross-pollinate, such as corn. This is easier for self-pollinators, such as soybeans.
- Higher processing and testing costs to prevent adventitious presence of GE materials in non-GE seed packages.
- More waste as seed lots that do not meet the threshold requirements are discarded or sold at a low cost.

Dr. Nicholas Kalaitzandonakes of the University of Missouri has both polled seed companies and developed a model to estimate the cost factors associated with providing non-GE seeds. His

model shows that reducing the threshold for adventitious presence dramatically increases the cost of compliance. He shows that the cost of compliance at the 0.5 percent threshold is three times the cost at a 1 percent threshold. At a 0.5 percent threshold, seed costs would be expected to increase approximately 27 percent while at a 0.3 percent threshold they would increase to 35 percent. Conversations with industry experts indicate that entities along the supply chain will require thresholds below the 0.5 percent limit to give themselves room for error.

Farmers

The Initiative requires a difficult choice for farmers. If it passes, farmers could switch to growing non-GE crops with the attendant loss of productivity and other consequences outlined below or continue using seeds developed through biotechnology and risk lost sales if food companies opt to replace GE ingredients to avoid labeling their foods.

Farmers that choose to grow non-GE crops will have higher costs from:

- Setting aside large pieces of land as a buffer against GE crops growing in nearby fields (one of several ways to isolate non-GE from GE crops); this land may need to be as wide as two miles to avoid pollen drift, depending on the crop.
- Spending more on pesticides. Farmers will have to revert to conventional and associated chemical pesticide use. This is not only costly, but it may have detrimental environmental impacts and may reduce yields.
- Suffering lower yields as crops are lost to drought and disease that would have been avoided with GE seeds.
- Testing crops several times to make sure that they did not become contaminated; contaminated crops may have to be destroyed and each test can cost as much as \$400.
- Maintaining substantial paperwork to prove that their crops are non-GE; farmers would have to obtain paperwork from all suppliers, such as seed producers and fertilizer manufacturers, and provide documentation to all customers.
- Defending the farm against bounty-hunter lawsuits, as these suits can be filed against anyone in the supply chain and do not require that defendants recover their costs in a successful defense; experience from California's Proposition 65 shows that this can result in thousands of dollars in legal and settlement fees to a farmer – even if he did nothing wrong.
- Complying with complicated labeling requirements if products are sold directly, such as through farmers markets and farm stands; in addition, they would not be permitted to market any of their wares that have been processed (even simply roasting peanuts) in any way as “natural.”

- Undergoing training (for both owners and employees) to understand compliance requirements.
- Purchasing insurance to help protect both personal and business assets against bounty-hunter lawsuits.

Farmers that do continue to use GE crops would risk losing sales as food companies search elsewhere for non-GE ingredients. Food companies may even look overseas for non-GE crops. California growers face unique burdens because they could lose sales to farmers outside the state or the US; 85 percent of the combined corn and cotton acreage grown in California today is GE

Grain Handlers

This ballot Initiative would have huge cost implications for grain handlers because it creates a *de facto* requirement for them to establish entirely distinct storage and processing capacity to segregate GE from non-GE grains – only by completely segregating these crops can handlers protect themselves from potentially ruinous litigation brought under the authority of the Initiative. Key cost elements include:

- Millions of dollars purchasing new grain handling equipment so they can prevent cross-contamination between non-GE and GE grains.
- Thousands on testing each batch of grain at multiples stages of processing; each test can cost as much as \$400.
- Maintaining documentation to prove that the crops are non-GE; handlers would be required to keep all paperwork from their grower-suppliers and document all aspects of their own testing and procedures.
- Exposure to bounty-hunter lawsuits, which can be filed against anyone in the supply chain and do not require that defendants recover their costs in a successful defense; experience from Proposition 65 shows that this can result in thousands of dollars in legal and settlement fees – even if they did nothing wrong.
- Training for facility operators and employees to understand compliance requirements.
- Obtaining insurance to help protect themselves against bounty-hunter lawsuits.

Food Producers and Retailers

The Initiative would impose significant costs for food producers and food retailers as well. The costs to small food producers and retailers could be high enough to cause some of them to go out of business, especially small firms based in California who are highly dependent on the California market. The Initiative could disadvantage these businesses relative to their out-of-state

competitors and make them unable to compete for business given higher costs and compliance burdens.

Like farmers, food producers have limited options for how they can comply with the Initiative: they can substitute their GE ingredients with organic or non-GE ingredients, they can reformulate their foods to exclude potentially GE ingredients, or they can label their foods as containing GE ingredients.

Removing GE Products

There are three main ways in which food producers can remove the GE products from their foods. These are discussed individually below. In Chapter 4, we quantify some of the costs associated with these options.

Substitute GE Ingredients with Certified Organic Counterparts

To avoid labeling their foods with what may be perceived as a frightening warning, many food producers may substitute their GE ingredients with non-GE ingredients. In fact, when GE labeling rules went into effect in the EU, most producers chose to replace their GE ingredients to avoid labeling their foods. Because organic foods are exempt from labeling, food producers may substitute their GE ingredients with organic ingredients.

Producers that replace GE ingredients with their organic counterparts will experience higher costs primarily due to the substantial premiums charged for organic crops. Our analysis indicates that organic ingredients can cost 100 percent more than their conventional (GE) counterparts (more information in Chapter 4). This premium reflects the lower yields of organic crops, higher labor costs and increased paperwork associated with maintaining certification.

Substitute GE Ingredients with Certified Non-GE Conventional Counterparts

In this option, the producers will replace their GE ingredient with their non-GE counterpart (*e.g.*, GE soybean oil with non-GE soybean oil) to avoid the “stigma” of labeling their foods. These producers will also face substantially higher costs. Our analysis indicates these ingredients can cost 24 to 96 percent more than their GE counterparts (further described in Chapter 4).

These costs reflect several factors, including the higher costs of preventing adventitious commingling at the seed, farm and elevator level, as well as the development of a new supply chain for these products in California. In addition, new paperwork requirements to demonstrate compliance with the Initiative will be required.

Reformulate Foods to Replace GE Ingredients

Another tactic producers can employ is to replace their GE ingredient with a different ingredient that is not genetically modified, such as GE soybean oil with palm oil (which is never GE at this time). To some extent, producers already do this for some of their products based on differential

costs on the commodity market. However, we believe that for the vast majority of products, this will be a costly and time-consuming undertaking.

Reformulating a food product is a complex, multi-stage process, which includes developing ideas for the new formula, testing them, conducting a financial study of the options, developing the products, undergoing consumer trials, test marketing and rolling out production. This process can take years, and it may not be possible to reformulate a product, such as a cookie, without altering its look, feel, taste, and nutritional attributes.

There are no cost parameters for the reformulation of an existing product. In addition, because this can take years to accomplish, there are likely few or no products that could achieve this change by the time the Initiative goes into effect.

Other costs

In addition to the costs outlined for each of the options above, there are several other areas in which producers and retailers will see higher costs:

- Maintenance of separate inventories, storage facilities and processing lines to ensure that GE products do not contaminate the non-GE products intended for the California market. Industry experts indicate that it will likely not be technically feasible to achieve the 0 percent threshold in 2019.
- Frequent testing of ingredients to ensure that GE levels remain below the 0.5 percent threshold.
- Relabeling and advertising costs to remove the use of “natural” to describe items that have been processed in even the most minimal way.
- Maintaining documentation to prove that the ingredients are non-GE; processors would be required to keep all paperwork from their suppliers and document all aspects of their own testing and procedures.
- Exposure to bounty-hunter lawsuits, which can be filed against anyone in the supply chain and do not require that defendants recover their costs in a successful defense; experience from Proposition 65 shows that this can result in thousands of dollars in legal and settlement fees – even if they did nothing wrong.
- Training for facility operators and employees to understand compliance requirements.
- Obtaining insurance to help protect themselves against bounty-hunter lawsuits.

No Substitution of GE Ingredients

Some food producers may choose not to substitute their GE ingredients with non-GE or organic ingredients. These producers will be required to add a label to their products indicating that they contain GE ingredients. These producers will face higher costs and loss of income from:

- Loss of business as consumers decline to purchase a labeled product, despite the lack of evidence that they are unhealthy.
- Loss of business as additional retailers choose to follow in the footsteps of Whole Foods and Trader Joe's and refuse to sell products bearing the GE label.
- Millions of dollars in relabeling and advertising expenses – only for the California market.
- Relabeling and advertising costs to remove the use of “natural” to describe items that have been processed in even the most minimal ways – even if there are no GE ingredients.
- Exposure to bounty-hunter lawsuits if there is a labeling error or other oversight; experience from Proposition 65 shows that this can result in thousands of dollars in legal and settlement fees – even if they did nothing wrong.
- Obtaining insurance to help protect themselves against bounty-hunter lawsuits.

Small and medium businesses may exit the California market or go out of business altogether because they cannot pay for all of these additional costs and remain competitive. Artisan food producers and other smaller businesses that are not organic may go out of business or exit the California market. This could reduce the number of products available for sale at retailers, and reduce the food choices available to California residents.

Consumers

The higher costs faced by farmers, grain handlers, food producers, and retailers will appear as higher food costs for California residents. These costs are estimated to range from approximately \$350 to \$400 per household (refer to Chapter 4).

The changes in how food is produced and in the physical handling and paperwork requirements will likely not increase the options available to California residents, but more likely will reduce food choices, since many smaller food companies may leave the California market. Consumers are likely to be left choosing between large multi-national producers that can afford the capital costs and can spread compliance costs across a large portfolio of products and the organic

companies whose products are exempt under the Initiative.^f Multi-nationals also benefit from scale economies in purchasing and compliance that smaller companies cannot achieve. It would be very difficult for artisanal food producers or retailers that are not certified as organic to remain in business in California or to sell their goods there.

^f Note that it is these organic producers – especially the larger ones – that are funding this Initiative. From a market power perspective, the elimination of small to mid-sized non-organic competitors is a powerful incentive for organic producers to be funding this effort.

3. Comprehensive Cost Framework

The cost framework developed includes eight factors that we have identified as the primary cost drivers for the Initiative. These factors are:

1. Applicability to foods eaten by California residents
2. Impact on farmers in California and the US
3. Cost of implementation to food producers and processors
4. Cost to consumers
5. Cost of testing
6. Potential legal costs
7. Costs of adding the required label to foods
8. Cost of prohibiting the use of the word “natural” in processed and non-organic foods
9. Cost of compliance in California only vs. nationwide

The chart below and Figure 3-1 summarize the main research findings for these nine areas. In Chapter 4, we provide estimates for the potential cost impacts of most of these factors. While some of the cost factors could not be quantified, such as the potential legal costs or the costs of compliance only in California, we believe that the calculations in Chapter 4 provide a reasonable estimate for the costs California households may experience as a result of the Initiative.

Cost of GE Ingredient Substitution

<p>Impact on foods eaten by Californians</p>	<p>It is estimated that 60-75 percent of processed foods contain at least one GE ingredient.^{5,6} Other sources estimate that 70 percent of the foods on the grocery shelves have at least one GE ingredient.⁷ Our analysis of food consumption data indicates that 66 percent of food expenditures per capita would be exempt from labeling (Chapter 1). This includes major food groups – meat, most dairy and alcohol – as well as food eaten away from home.</p> <p>To avoid labeling their products with a vague and potentially frightening warning, it is assumed that most or all food manufacturers will generally choose to replace their GE ingredients with non-GE or organic ingredients. This is based on the experiences in Japan and Europe.⁸ Artisanal food producers that do not sell organic products may go out of business or exit the California market. Consumers are likely to be left choosing between large multi-national producers that can afford the capital costs and can spread compliance costs across a large portfolio of products and the organic companies whose products are exempt under the Initiative.⁹ This does not increase consumer choice, but could represent a cost to consumers.</p>
<p>Impact on organic farming in California and the US</p>	<p>Organic foods are exempt from the Initiative. Certified organic farms receive their certification based on their process, which includes not using GE seeds. USDA’s National Organic Program has not established a threshold for the adventitious presence of GE substances, while EU policies allow for up to 0.9 percent GE content in organic foods. It is possible for organic foods to contain higher levels of GE ingredients than the level that would trigger labeling of conventional foods under the Initiative.</p> <p>Some manufacturers may choose to replace GE ingredients with their organic counterparts. If this is a widespread practice, they may be required to seek products outside the US, as it is unlikely that sufficient supply exists domestically. USDA already estimates that organic imports accounted for 12-18 percent of organic sales in 2002, and that organic imports from countries with lower labor and input costs have nearly replaced organic production in the US in some commodities.⁹ As organic farming expands domestically under this option, prices could decrease. We expect that it is primarily large organic producers that would benefit from the increased sales, while small farmers may suffer from lower prices.</p>

⁹ Note that it is these organic producers, especially the larger ones, that are funding this Initiative. From a market power perspective, the elimination of small to mid-sized non-organic competitors is a powerful incentive for organic producers to be funding this effort.

<p>Impact on conventional farmers in California and the US</p>	<p>To help ensure minimal or no adventitious commingling, farmers growing non-GE crops may elect to physically segregate non-GE and GE fields. Wind represents one variable the farmers cannot control, and pollen drift is therefore very difficult to prevent, particularly in crops that crosspollinate, such as corn and canola. Studies indicate that if buffers are used, the separation between GE and non-GE fields may need to be as much as two miles.¹⁰ Farmers may not be able to use these large buffers for revenue-generating activities.</p> <p>Shifting to non-GE crops also has implications for insect, pest, and weed management. Reverting to conventional means of control means higher costs, greater environmental impact, and potential yield losses. GE crops may also be more drought tolerant and produce higher yields.</p> <p>Farmers may also lose business to international growers that are already producing non-GE crops. As of 2010, 93 percent of soybeans, 86 percent of cotton and 90 percent of canola grown in the US were genetically engineered. If manufacturers are not able to source California- or US-grown non-GE ingredients, they may choose foreign growers. This may particularly be the case soon after the implementation of the law, before growers are able to transition to non-GE crops.</p>
<p>Cost to food producers and processors</p>	<p>Research indicates that the costs rise substantially when tolerance levels decrease. For instance, one study found that the cost of demonstrating non-GE rises from 1.45 to 4.25 cents per bushel when tolerance levels drop from 5 percent to 0.5 percent.¹¹ (Different varieties of wheat sold for \$6.68-\$9.65 per bushel the week of March 26, 2012¹²) Another study found that developing seeds that were non-GE within a 0.5 percent threshold cost 27 percent more compared to a 2-5 percent threshold.¹³ Higher purity levels will require more separation of handling systems and higher rejection levels. For instance, a mechanical planter would have to be cleaned for at least one hour between GE and non-GE runs to achieve 99.9 percent purity, and removing virtually every kernel of grain from a combine would cost between 0.09 and 0.6 cents per bushel. Furthermore, grain elevators have not been designed to be “kernel clean.”¹⁴</p> <p>These costs will also be borne by food producers and processors. The organic premium is estimated to be approximately 100 percent compared to their conventional (GE) counterparts. We estimate that the non-GE premium would range from 24 to 96 percent compared to their conventional counterparts. These estimates are explained in greater detail in Chapter 4.</p> <p>Experts indicate that while 0.5 percent would be feasible but costly, that achieving 0 percent adventitious presence, as the Initiative would require in 2019, would be cost prohibitive and most likely technically infeasible. While China and Malaysia have zero percent thresholds for labeling foods with GE ingredients, it</p>

	<p>is unclear how they enforce these requirements.</p> <p>A paperwork trail to demonstrate identity preservation will have to be maintained at all levels of the supply chain. Products will have to be identified, segregated, and labeled at all times.¹⁵ While the proposed legislation does not require state testing, entities along the supply chain will likely engage in substantial testing to protect themselves against potential legal action.</p>
Cost to consumers	<p>The cost to consumers is explored further in Chapter 4. We use several approaches to quantifying the potential costs to consumers, finding that the implementation of this Initiative will conservatively cost households at least several hundred dollars per year in higher food costs.</p>
Legal and Testing Costs	
Cost of testing	<p>Two types of tests are primarily used to detect GE ingredients. The PCR test is DNA-based and is the more sensitive of the tests, and it can qualitatively detect GE presence at a 0.01 percent threshold and quantitatively detect GE at 0.1 percent level (actual results will vary from lab to lab). The ELISA test is usually administered as a strip test and tests for protein antibodies. It is rapid and lower cost than the PCR test, although it is limited to testing for specific proteins and is only 95 percent reliable. The strip test can cost as little as \$5, while the PCR test can cost as much as \$400; however, the lower tolerance levels of the PCR test may make it more appealing at the low threshold level proposed in the Initiative.¹⁶ The tests are conducted at every stage of the supply chain.</p> <p>A 2002 study found that GE testing could cost as much as 28 cents for a bushel of wheat.¹⁷ However, testing costs will be substantially higher under the lower thresholds of the Initiative compared to Europe and other areas. These costs have not yet been quantified. In addition, there is at this time no test that could be used to confirm 0 percent presence of GE in a food.</p>

Potential legal costs	<p>The experiences under Proposition 65 can provide insight into the potential legal implications of the Initiative. Both Proposition 65 and the proposed GE act allow private citizens to sue and collect damages, and there is evidence of “bounty-hunter” lawyers whose businesses are built entirely on filing Proposition 65 lawsuits. There is no requirement under Proposition 65 that defendants recover their costs in a successful defense. The GE act would cover a sweeping range of products that can be compared to those covered under Proposition 65.</p> <p>Between 2000 and 2011, there have been 2,473 Proposition 65 settlements totaling \$157 million, including \$96 million in lawyers’ fees and expenses.¹⁸ Because defendants do not recover their costs in a successful defense, bounty-hunter lawyers remain the main winners under this law.</p> <p>There are currently several lawsuits claiming misleading use of the word “natural” to describe processed foods. One lawsuit, against Frito-Lay, is seeking \$5 million in damages.¹⁹</p>
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Relabeling and Rebranding Costs

Costs of adding the required label to foods	<p>Some manufacturers may seek to avoid the additional supply chain costs by keeping their ingredients the same and labeling their foods as containing GE ingredients. Relabeling has cost implications as well as severe marketplace impacts. We do not anticipate that this would be a realistic compliance scenario for more than a very small sample of the more than 300,000 food products on the market.²⁰</p> <p>California represents 12 percent of the American population, which is significantly higher than the next largest state – Texas – at 8 percent. Because the GE law covers any foods produced or sold in California, many food companies may choose to label their foods nationwide. Not captured in these cost figures are the potential costs of increasing customer awareness when products they consume change.</p>
Cost of the prohibition of the use of the word “natural” in processed and non-organic foods	<p>According to the USDA, 8.4 percent of new products introduced into the marketplace in 2009 were marketed as “natural.”²¹ If there are 300,000 food products nationwide, that means that at least 25,000 products were tagged with the term “natural” and it would cost \$1,300 to \$3,700 per SKU to change the label on those products. The impacts of the prohibition extend far beyond labeling, but these impacts were outside the scope of our analysis.</p>

California-Specific Mandate

Cost of compliance in California only vs. nationwide

California produces \$20 billion in food commodities, consumes \$17 billion in food and (nonalcoholic) beverages and accounts for 12 percent of the US population. This makes California the largest market in the US. Proposition 65 affects companies nationally, as they label or modify their products for sale in California. Food manufacturers may choose to implement the Initiative by modifying only the subset of foods sold in California. However, that would require the development of additional SKUs and include other challenges, such as modification of truck routes to ensure that GE products are kept outside the state, accurate demand forecasting for California, and the addition of additional warehouse space. Food manufacturers may choose to implement the GE requirement on a regional or nationwide basis to avoid substantially higher storage and distribution costs. This would also help avoid potential issues such as a shipment of potato chips to western Nevada resulting in some bags turning up in stores in California. The potential costs of these decisions not been measured in studies. Another option is for the food manufacturer to exit the California market completely, although that appears unlikely due to the large size of the market.

Figure 3-1

Entities Impacted Across the Supply Chain

	Seed Producers	Farmers	Elevators/Grain Handlers	Processors/Manufacturers	Retailers	Consumer
Separate storage, handling and transportation systems	*	*	*	*		Costs along the supply chain would be expected to be reflected in consumer price.
Separate harvesting systems or comprehensive equipment cleaning systems	*	*	*			
Documentation/ paper trail	*	*	*	*	*	
Testing systems*	*	*	*	*		
Product reformulation				*		
Supply contract changes			*	*		
Separate processing lines or comprehensive equipment cleaning systems				*		
Inventory management system changes			*	*	*	
Label changes				*	*	
Training	*	*	*	*	*	
Insurance	*	*	*	*	*	

* Note: While Initiative does not mandate testing, companies along the food chain will likely implement testing procedures to protect themselves against potential legal action.

4. Estimated Cost Impact to Consumers

Summary

The Initiative would force significant changes to a substantial part of the food supply in California. In order to translate those changes into economic impacts to California consumers, we first had to consider how the Initiative would affect retailers and food producers, who would be faced with decisions about how to bring tens of thousands of products into compliance with the Initiative.

We caution that predicting the response of the entire global food supply to these requirements requires many generalizations and simplifications. No country with (enforced) GE labeling requirements has ever contemplated thresholds for GE ingredients as low as 0.5 percent and none would realistically consider 0 percent thresholds as plausible. Yet, those are the limits that are included in the Initiative. Therefore, experience in other countries and even research done previously in the US, which assumed much higher thresholds, are of limited assistance in guiding us to understand if such levels could be met and, if so, at what cost.

The compliance scenarios that we believe would be the most likely for companies to pursue carry very high price tags for those businesses and, ultimately, for California consumers. These scenarios assume that food companies and their suppliers opt to substitute other ingredients for GE ingredients in their products. This means that companies would change the way in which they source ingredients or manufacture their products in order to avoid labeling their products with a vague and potentially frightening warning that conveys little meaningful information.

- Scenario 1 assumes the substitution of organic ingredients for GE ingredients. This is a costly option because of the very high price premiums for these inputs to foods.
 - The mid-point of our cost estimate for this scenario is \$401 per household in higher food costs (Figure 4-1); this represents a 3.1 percent increase in total food spending.
 - It is not clear that there is sufficient supply of organic ingredients to accommodate the resulting demand in California, and since there is a significant lag time in having farms and products certified organic, this scenario may not be feasible for a significant share of the food supplied to California.
- Scenario 2 assumes that producers and suppliers substitute certified non-GE ingredients for GE ingredients. The true costs of segregating these ingredients from GE crops are very difficult to estimate because of the lack of experience with guaranteeing that the presence of GE material stays below the proposed 0.5 percent threshold – a threshold that many experts believe will be very difficult to achieve.
 - The mid-point of our cost estimate for this scenario is \$348 per California household, equal to a 2.7 percent increase in household food spending.

- Our cost assumptions reflect experience meeting thresholds that are higher than those proposed in the Initiative. As a result, we believe our estimates are conservatively low and may not reflect the true costs of ensuring supplies of certified non-GE ingredients at very low thresholds.
- This scenario would not be practical for compliance after the proposed 0 percent threshold becomes effective in 2019. At this point, substitution with non-GE ingredients would likely no longer be feasible, as confirming 0 percent GE is not possible even with the most sophisticated identity preservation and testing methods.

Figure 4-1

Summary of Compliance Costs per Household (\$)



Source: Figures 4-2, 4-5

Scenario 3 reflects past research done to quantify the costs of substituting GE ingredients for non-GE ingredients, but the studies assumed a much higher allowable threshold for GE material. The mid-point cost estimate using that research is about \$400 per California household. Research described below indicates that lowering the threshold has a disproportionate impact on compliance costs because of the difficulty of segregating ingredients to such a high tolerance. Because this Scenario is based on more dated information and higher thresholds, we assumed that our current costs would be at least as high as indicated in this prior research.

Cost Scenarios

To develop compliance cost estimates, we integrated our analysis of what foods would be subject to the Initiative (Chapter 1) with data on various cost elements (Chapters 2 and 3) that companies may incur as they seek to comply with the unprecedented provisions of this Initiative.

Based on experience in other parts of the world, review of the literature, and discussions with academic and business experts, we believe the most likely means of compliance for food companies is to substitute other ingredients for GE ingredients in their products. This means that

companies would change the way in which they source ingredients or manufacture their products in order to avoid labeling their products with a vague and potentially frightening warning that conveys little meaningful information.

Our cost analysis therefore focuses on various substitution scenarios available to food companies that would enable them to comply with the provisions of this unprecedented law. The cost implications of compliance are substantial – in aggregate dollar terms and in terms of the costs and burdens on California households. We assume throughout the analysis that the higher costs that the Initiative imposes on the food supply chain – from seed producers through to retailers – would be passed on to California consumers in the form of higher prices. These substitution options would also be very time-consuming, as converting sufficient acreage of GE crops to organic or non-GE crops would take several years, and is not expected to be possible by the 2014 implementation date.

We developed two different substitution scenarios for affected foods and also considered an option where foods containing GE ingredients were not altered, but were labeled as such as required in the Initiative. It is likely that food producers would employ a combination of approaches:

- **Scenario 1: Substitution with organic ingredients.** In this scenario, we assumed that GE ingredients would be replaced with their organic counterparts. While this may not be feasible as a means of compliance for all products (*i.e.*, supply of organic inputs may be limited or unavailable), it may be attractive for companies because of the blanket exemption offered for organic foods in the Initiative. It is important to note that while organic foods are exempt from labeling under this Initiative, they may still include GE ingredients that would render them subject to labeling if they had not been organically grown.
- **Scenario 2: Substitution with certified non-GE ingredients.** Producers could also obtain non-GE versions of at least some of the GE ingredients they use today. While such crops are grown in the US today, most are exported and none are held to the very low GE material threshold of 0.5 percent established beginning in 2014. This scenario takes recent information on price premiums for key GE crops and adjusts it to account for the lower threshold and for the ultimate cost impacts on finished food products.

For comparison purposes, we also examined a scenario (Scenario 3) in which non-GE ingredients were substituted for GE ingredients, but we used existing literature summarizing prior research on the costs of this approach. The limitation to this scenario is that much of the cost research on which it is based is quite dated and based on achieving and maintaining much higher thresholds (*i.e.*, allowable levels of GE ingredients of one to as much as five percent), not the 0.5 percent threshold that would take effect in California in 2014.

Despite these limitations this older research is helpful because it articulates how segregating GE from non-GE ingredients imposes costs throughout the supply chain in countries like the US and Canada that both grow and produce most of their food.

Next, we conducted a limited analysis of the costs of the Initiative's severe restrictions on the use of the term "natural" on food labels and advertising (Scenario 4). Since "natural" claims and attributes are extremely common among foods, the impact of banning these products and claims would have a far-reaching impact on many producers. A complete analysis of this provision was outside the scope of this analysis; we considered only costs from labeling changes, but not some of the more far-reach impacts such developing new marketing and branding campaigns and legal costs. Under a regulatory regime where simply freezing a food renders it illegal to claim the food as "natural," the opportunities for violations and bounty-hunter suits are abundant.

Lastly, we considered a compliance option in which producers do not substitute for GE ingredients, but simply label their products as required by the Initiative. This labeling approach avoids the need to modify the ingredients, to test the foods for GE ingredients, or to defend against bounty-hunter lawsuits. The impact of this decision on the viability of that product in the marketplace would likely be dramatic. We assume that the reason producers elsewhere have avoided this option is because of adverse consumer reaction to the labeling. Proponents of the Initiative, like the Organic Consumers Association, have publicly stated that their goal is to ban GE ingredients altogether. Similarly, the label has been likened to a "skull and crossbones." We therefore do not view this as a viable compliance scenario except in very rare circumstances.

Development of Cost Estimates for Compliance Scenarios

Scenario 1: Organic Substitution

The Initiative exempts foods that are certified organic from GE labeling, even though there is a possibility of GE content in certified organic foods. In fact, formal policies in the European Union allow up to 0.9 percent GE content in these foods – a significantly higher level than the 0.5 percent that would trigger labeling under the Initiative in 2014 or the 0 percent threshold that takes effect in 2019. The US does not have an explicit GE threshold for organic foods. Under this scenario, we assumed that food manufacturers could replace their GE corn, soy, sugar or other ingredients with their organic counterparts.

Organic Premium

Commodity markets for certified organic foods show a clear premium on the price of organic inputs. This reflects the fact that organic farming can be costlier because it is more labor intensive and has lower yields. In addition, there is a paperwork burden associated with certified organic foods that does not exist for conventional products.

We referenced two analyses pointing to price premiums of approximately 100 percent on organic grains. First, Foster's study of price premiums in the non-GE market found that the average premiums in 2009 were 137 percent for food-grade organic corn, 116 percent for soybeans and 109 percent for wheat.²² Feed-grade grains had slightly lower premiums. On May 9, 2012, we compared the market prices for corn #2 and feed-grade soybeans – the only two markets for which this data was available. Organic corn had a 120 to 130 percent premium the week of May 9th, while soybeans had a premium of approximately 80 percent. Based on these ranges and to be somewhat conservative, we assumed that organic inputs have a 100 price premium compared to

their conventional counterparts. While companies use GE ingredients that are not derived from corn or soybeans, these are the most common GE crops and are ubiquitous in the food supply. We therefore used these inputs as indicative of the impact of other GE inputs. Because supply of organic inputs may be constrained, especially over the next several years, price premiums may actually be greater than we have assumed, leading to even higher costs.

Since organic certification already includes a paperwork component, we did not assume an additional paperwork burden for this option (*i.e.*, those costs are already embedded in the price premium).

Ingredient Share of the Food Dollar

While the cost of an input may rise because it is organic or certified non-GE, the whole (processed) food will not go up by an equivalent amount in most cases. This is because the cost of the grain or other farm inputs accounts for only a small amount of the overall cost of the food at retail (*i.e.*, as priced on a grocery shelf). To determine the potential cost of substituting GE ingredients with their organic counterparts, we needed to estimate the percentage of the food dollar on the shelf that is attributable to grains and other farmed ingredients. Because there is no definitive figure for the overall percentage of corn, soybeans, sugar beets or canola in the foods Americans purchase, we developed a range for this figure.

A 2002 study stated that the cost of grain is approximately one-quarter the cost associated with generating the average processed food.²³ While this may be true for some foods, data from the USDA estimates that in 2008, farm and agribusiness costs accounted for 11.6 cents of every food dollar. The majority of the rest of the dollar was used for food processing, food services, advertising, transportation and other costs. That is, 11.6 cents of every dollar we spend on food goes towards the farmed ingredients.²⁴ Because the USDA data are based on an established methodology used by other researchers and encompasses all foods, we assumed that 12 percent was an appropriate upper bound on the farm share of food dollars.

We recognize, however, that not all farm inputs to a particular food product come from GE sources, so we developed a lower bound for this assumption that reflects the relative prevalence of GE crops among all grains and oilseeds used in food production. We assumed that roughly half of these inputs (corn and soy, primarily) are likely to be GE so for a lower bound we assumed that substitution would be required for only half of the farm inputs to food products (*i.e.*, 6 percent of food dollars).²⁵

Again, as with the organic price premium, these are simplifications of actual cost factors that vary significantly from one product to another. Since we are using this information to compute costs across a broad range of food items, however, these averages are appropriate for use; they might not be appropriate to apply to a particular food or category of food, however.

Percentage of Food Subject to the Initiative

As explained in Chapter 1, we determined that because of the broad range of exemptions incorporated into the Initiative language, 34 percent of the money spent on food and beverages

(including alcohol and foods eaten away from home) appears to be potentially impacted by the Initiative. Because we developed this estimate using 2009 consumer expenditure data and the definitions and exemptions in the Initiative, we believe this is a reliable and conservative estimate. We also sought other data to verify the potential share of food that might be modified to include non-GE ingredients and thereby avoid labeling under the Initiative. In 2000, the Grocery Manufacturers Association estimated that 70 percent of the food on grocery shelves contained GE ingredients. Assuming that this would roughly correlate to the same percentage of expenditures on foods purchased in a grocery store, when combined with alcohol purchases and food eaten away from home, we calculate that approximately 36 percent of all food purchased would be potentially covered by the Initiative. While this is a much less detailed approach, it is close to our 34 percent figure and verifies that it is reasonable.

Because both estimates were nearly the same and we had more confidence in our own analysis in Chapter 1, we assumed that 34 percent of food expenditures would be covered by the Initiative.

Anticipated Increase in Food Spending

The premium in the market price for organic grains will result in an increase in food prices to consumers, when these organic inputs are substituted for GE ingredients in food. If the substitution to organic inputs were used as the compliance scenario for all foods subject to labeling, we can compute the increase in food spending among California households using the following variables:

- Price premium for organic inputs: 100%
- Percentage of food subject to labeling: 34%
- Farm ingredient share of food dollar: 6% to 12%
- Total per capita food and alcohol expenditures – 2010: \$4,520 (USDA)
- Average household size – California: 2.9 (Census)
- California residents (June 2011): 37,691,912 (Census)^h

The calculations for this Scenario (Figure 4-2) indicate that if all food producers opt to substitute organic ingredients for those that are currently GE, the impact on the average California household would range from \$267 to \$535 per year in higher food costs, with a mid-point value of \$401. Those increases represent between 2.0 percent and 4.1 percent of total spending on food and beverages by those households. In aggregate dollar terms, these total between \$3.5 and \$7.0 billion per year in higher food costs in the state with a mid-point estimate of \$5.2 billion.

^h Sample calculation – lower bound: \$4,520 per capita spending * 2.9 people/household * 34% of food spending subject to labeling * 6% farm cost factor * 100% increase in farm inputs = \$267 per household which is 2.0% of \$13,108 of household spending on all food and beverage, at home and away from home.

Figure 4-2

Scenario 1 – Substitution of GE Ingredients with their Organic Counterparts

		Increase in Food Spending		
		Cost per California Household per Year	Increase in Household Food Spending	Statewide Annual Costs (\$ billions)
Ingredient Share of Food Dollar	Low	\$267	2.0%	\$3.5 billion
	High	\$535	4.1%	\$7.0 billion
	<i>Midpoint</i>	\$401	3.1%	\$5.2 billion

Scenario 2: Certified Non-GE Substitution

Another approach that is likely to be more practical in the short term and somewhat less expensive on average is for food manufacturers to replace GE ingredients with their certified, non-GE counterparts. For instance, GE corn would be replaced by certified non-GE corn. Currently the quantity of both organic and non-GE corn and soybeans are relatively limited in the US. Converting farms over to non-GE crops may be quicker and more practical in the short term than waiting for the organic certification process, which takes several years.

Non-GE Price Premiums

Available data indicate that price premiums of non-GE grains over their GE counterparts vary. One of the most important variables in assessing the price premium is the threshold level of GE material permitted in the non-GE batches. This is a parameter that is continuously tested at the farm, at the elevator, in transit, and at processing and production facilities. The lower the threshold, the more frequent testing is required and the more costly intervening steps are required to ensure isolation of non-GE from GE material. This is discussed in Chapters 2 and 3.

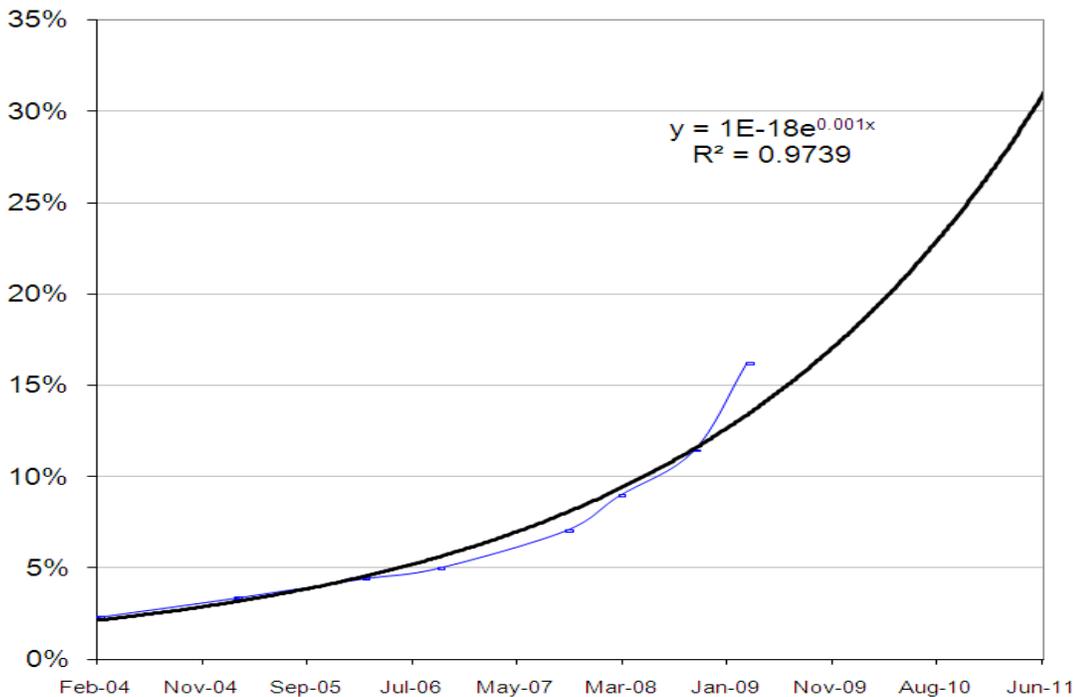
In developing data for this analysis, we had the disadvantage of trying to determine the premium for non-GE material that, at least for 2014 to 2019, would have to meet a 0.5 percent threshold – the lowest of any program in the world for which information is available. With no real world experience achieving those levels on a broad scale, we had to apply findings of research done to simulate cost impacts of very low thresholds. That research, described below, indicates that costs increase exponentially as the thresholds are lowered.

Foster reported price premiums for non-GE corn and soybeans in Illinois from February 2004 to March 2009.²⁶ This study appears to be geared towards the EU compliance market, and we therefore assumed (it is not stated explicitly) that it employed a 0.9 percent threshold, consistent with EU policy. The study showed a clear upward trajectory in the price premium for both crops between 2004 and 2009. Incorporating data on base prices for the same periods, the non-GE

premium for corn increased from approximately two percent to 16 percent from 2004 to 2009 (see Figure 4-3 – data points graphed in blue), while for soybeans the premium increased from approximately five percent to 20 percent. We extrapolated from Foster’s dataset to mid-2011 to find the expected premium for 2011. The sample regression analysis and function for corn is shown as an illustration in Figure 4-3 and the 2011 premium for certified non-GE corn was projected to be 32 percent.

Figure 4-3

Percentage Premium for Non-GE Corn



Source: Foster (2010) with extrapolation by Northbridge to today

We performed a similar extrapolation of data for soybeans and projected a current price premium of 24 percent. Because soy is a self-pollinator, it is considered to be an easier crop than corn to isolate from GE presence. As a result, we concluded that the low end of the range would be a 24 percent premium based on soybean data. This does not reflect, however any premium for achieving the much lower threshold in the Initiative and is therefore likely a very conservative figure.

To develop an upper bound for this factor that reflected the reality of higher costs to achieve low thresholds, we began with the 32 percent premium for corn derived in the analysis described above (the higher percentage reflecting the complexity of isolating a crop where wind, birds, and other agents can result in cross pollination between non-GE and GE fields). Nicholas Kalaitzandonakes and Alexandre Magnier of the University of Missouri have done extensive research on the cost of achieving GE thresholds in the seed market. Their model estimates that there is a three-fold increase in the cost of supplying corn seeds at a 0.5 percent GE threshold compared to a 1.0 percent threshold. To account for the lower thresholds imposed in the

Initiative we scaled the 32 percent premium by a factor of three so the upper bound of the price premium for certified non-GE corn at a 0.5 percent threshold was assumed to be 96 percent.

Cost of Recordkeeping

The Initiative imposes *de facto* recordkeeping requirements because suppliers from the seed producers all the way to the retailers must be able to demonstrate compliance (in this case through use of certified, non-GE inputs) at each step of the supply chain. This requirement means that participants must document and maintain proof of inputs remaining below the threshold that would trigger reporting; this documentation would be the only defense against bounty-hunter lawsuits brought under the Initiative.

In order to quantify the impact of this paperwork burden (in addition to the higher cost of the inputs themselves), we examined the analysis from the USDA related to the recently implemented Country of Origin Labeling (COOL) requirement for meats, vegetables, and nuts. We believe that the need to develop new reporting and tracking procedures provide a reasonable approximation of the burden associated with recordkeeping to document non-GE ingredients. In promulgating the Final Rule for this requirement, USDA estimated the per-entity costs for implementing a paperwork and tracking system associated with implementing the Rule.²⁷ These unit costs are shown in Figure 4-4.

To determine the number of establishments subject to reporting and recordkeeping, we used data from the 2007 Economic Census and limited our analysis to California establishments only. This is a very conservative assumption since producers and intermediaries in many other states would also be affected by the Initiative and would incur costs. The producer groups included food processors and manufactures, intermediaries included food and beverage wholesalers, and retailers included food stores, drug stores, health supplement stores, wholesale clubs, and convenience stores.

Figure 4-4

Costs to Establish Paperwork Tracking Systems Under Scenario 2

	California Establishments*	One-Time Implementation Costs per Establishment**	One-Time Paperwork Costs per Establishment**	Annual Paperwork Costs per Establishment**
Producers	5,785	\$369	\$79	\$139
Intermediaries	4,114	\$45,285	\$1,229	\$3,331
Retailers	44,398	\$28,273	\$145	\$6,794
Totals	54,297			

* 2007 Economic Census (see text)

** Rulemaking for COOL

The one-time implementation and paperwork cost is estimated to be \$1.72 billion and assuming this cost is annualized over five years at an 8 percent discount rate, we computed an annualized cost of \$431 million per year or \$33 per California household. The annual paperwork costs total \$335 million per year or \$26 per household. The combined annualized cost is therefore \$766 million and \$59 per household. We believe that these calculations underestimate the true paperwork costs of this option because the number of affected farms and elevators could not be ascertained from Census or USDA data, and it also does not include out-of-state manufacturers and wholesalers that sell to California.

Anticipated Increase in Food Spending

The premium in the market price for non-GE crops and the paperwork costs will both result in an increase in food prices to California consumers. If the substitution to non-GE inputs were used as the compliance scenario for all foods subject to labeling, we can compute the increase in food spending among California households using the following variables:

- Price premium for non-GE inputs: 24% to 96%
- Percentage of food subject to labeling: 34%
- Farm ingredient share of food dollar: 6% to 12%
- Paperwork and tracking burden (per household): \$59
- Total per capita food and alcohol expenditures – 2010: \$4,520 (USDA)
- Average household size – California: 2.9 (Census)
- California residents (June 2011): 37,691,912 (Census)ⁱ

The calculations for this scenario (Figure 4-5) indicate that if all food producers opt to substitute certified non-GE ingredients for those that are currently GE, the impact on the average California household would range from \$123 to \$572 per year in higher food costs, with a mid-point value of \$348. Those increases represent between 0.9 percent and 4.4 percent of total spending on food and beverages by those households. In aggregate dollar terms, these total between \$1.6 and \$7.4 billion per year in higher food costs in the state with a mid-point estimate of \$4.5 billion. Given the conservative nature of our cost assumptions, we expect actual costs would fall at the upper ends of the ranges we have computed.

ⁱ Sample calculation – upper bound: \$4,520 per capita spending * 2.9 people/household * 34% of food spending subject to labeling * 12% farm cost factor * 96% increase in farm inputs = \$513 per household plus \$59 for paperwork costs totals \$572 which is 8.4% of \$13,108 of household spending on all food and beverage, at home and away from home.

Figure 4-5

Scenario 2 – Substitution of GE Ingredients with Certified Non-GE Counterparts

		Increase in Food Spending (Low – High Price Premium)		
		Cost per California Household per Year	Increase in Household Food Spending	Statewide Annual Costs (\$ billions)
Ingredient Share of Food Dollar	Low	\$123 - \$316	0.9% - 2.4%	\$1.6 – \$4.1 billion
	High	\$187 - \$572	1.4% - 4.4%	\$2.4 – \$7.4 billion
	<i>Midpoint</i>	\$348	2.7%	\$4.5 billion

Scenario 3: Cost Implications from Other GE Labeling Studies

Several studies have been conducted which seek to quantify the potential costs of GE labeling laws to consumers and entities along the supply chain. As in Scenarios 1 and 2 above, these studies assume that most, if not all, manufacturers will avoid labeling their products as containing GE ingredients by utilizing ingredients that would not trigger a labeling requirement.

Many of these studies pre-date the implementation of GE labeling laws in Europe, Japan, and elsewhere and the projected impacts on retail food prices vary widely, but most estimated increases in the range of six to 12 percent. These studies are of limited value in analyzing this Initiative, because the Initiative requires a GE threshold that is lower than what exists in almost any other country and lower than what was analyzed in the research. Since we have demonstrated that costs increase rapidly as lower thresholds are imposed, these older studies serve primarily as a benchmark against which to compare our estimates. We expected that our substitution Scenarios 1 and 2 would show higher costs than these studies.

Using the assumptions from our previous Scenarios, we can compute the increase in food spending among California households using the following variables:

- Price premium for non-GE inputs (retail level): 6% to 12%
- Percentage of food subject to labeling: 34%
- Total per capita food and alcohol expenditures – 2010: \$4,520 (Census)
- Average household size – California: 2.9 (Census)
- California residents (June 2011): 37,691,912 (Census)^j

The calculations for this Scenario indicate that the previous studies suggest costs of compliance, ranging from roughly \$270 to \$540 per household. We expected that these older studies would

^j Sample calculation – upper bound: \$4,520 per capita spending * 2.9 people/household * 34% of food spending subject to labeling * 12% retail price premium = \$535 per household which is 4.1% of \$13,108 of household spending on all food and beverage, at home and away from home.

show lower costs than our current scenarios; the fact that they are in the same range suggests that our substitution costs in Scenarios 1 and 2 may be conservatively low for the reasons enumerated in our Limitations section.

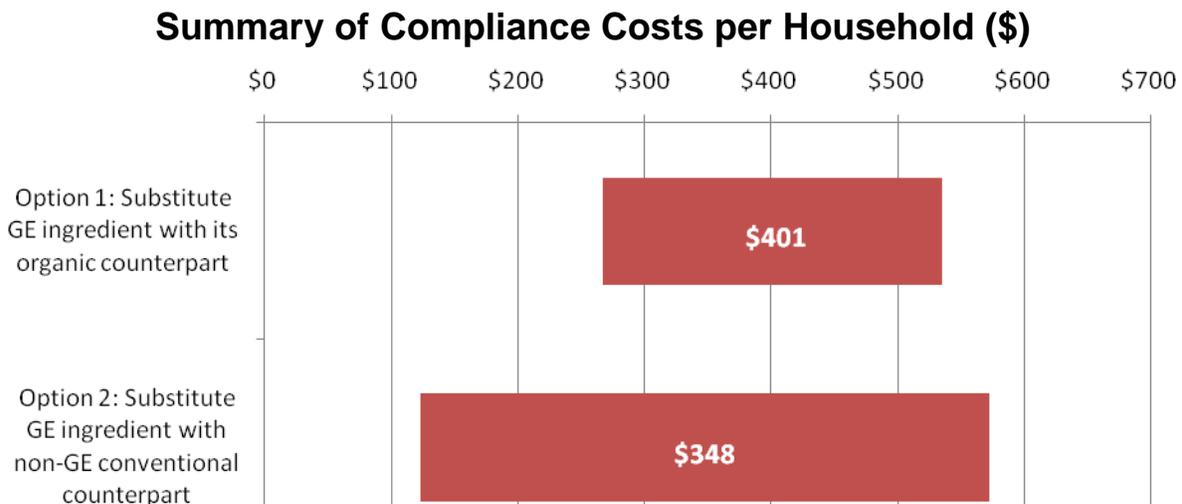
Summary of Substitution Scenarios

The most likely compliance scenarios carry very high price tags for California consumers. Scenarios 1 and 2 have mid-point cost estimates of \$401 and \$348 per California household, implying that the average households' food and beverage spending would have to rise 2.7 to 3.1 percent to cover the costs of replacing GE ingredients in their food (Figure 4-6).

We have also summarized the mid-point and cost ranges for the various substitution scenarios in Figure 4-7. This table shows the per-household costs as well as the impact that these higher costs would have on household food budgets. These percentage increases are computed across all spending on food and beverages by households, even though the labeling provisions only apply to foods consumed at home. The percentage increase in *at-home* food spending would be nearly double the levels shown in the table (*i.e.*, a 3 percent increase in total food spending would equate to a 6 percent increase in spending on food consumed at home).

Finally, we computed costs on a state-wide basis, aggregating consumer costs across all households. The total annual consumer cost to pay for the changes made to the food supply by the Initiative range from \$4.5 to \$5.2 billion.

Figure 4-6



Source: Figures 4-2, 4-5

Figure 4-7

Summary of Compliance Cost Scenarios – Substituting for GE Ingredients

	Cost per California Household per Year	Increase in Household Food Spending	Statewide Annual Costs (\$ billions)
Scenario 1: Substitute GE ingredient with organics	\$401 (\$267 - \$535)	3.1% (2.0% - 4.1%)	\$5.2 billion (\$3.5 - \$7.0)
Scenario 2: Substitute GE ingredient with non-GE	\$348 (\$123 - \$572)	2.7% (0.9% - 4.4%)	\$4.5 billion (\$1.6 - \$7.4)

Source: Figures 4-2, 4-5

While we have assumed that these costs are ultimately borne by California consumers, it is important to remember that the incidence of these costs is spread throughout the food supply chain. Costs to substitute ingredients spread from farm to factory and accumulate in higher wholesale prices paid by retailers, which are then marked up and passed on to consumers.

California retailers are not only affected by having to pay higher prices from their suppliers, however. Retailers are also, in many cases, the producers of foods that would be subject to labeling under the Initiative. Private label brands of products from salad dressings to cake mixes would be subject to labeling and we assume that they would follow the same compliance scenarios as the national and regional brands against which they compete.

To quantify the share of the cost impact that might be borne by private label brands, we multiplied the aggregate cost estimates of \$4.5 to \$5.2 billion by the private label share for foods in supermarkets, which is currently 19 percent.²⁸ This suggests that food retailers with private label brands face potential costs of \$860 to \$990 million annually themselves to modify their products to avoid labeling. It is also critical to remember that retailers are on the front lines with regard to the litigation costs resulting from the Initiative and though we were not able to estimate these costs, retailers would likely be named in most suits.

Scenario 4: Eliminate Use of the Word “Natural”

While largely outside the scope of this analysis, we note that regardless of the compliance option (or combination thereof) that food producers choose to adopt, the elimination of the term “natural” on food products and in advertising is an added burden imposed by the Initiative.^k According to the most recent USDA data on food and beverage marketing, 8.4 percent of new products introduced into the marketplace in 2009 were marketed as “natural.” Assuming 300,000 food products are available in the California marketplace and 8.4 percent marketed as “natural,” then approximately 25,000 food products on grocery store shelves today would be effectively banned by the Initiative

^k The Initiative states that a “food may not in California, on its label, accompanying signage in a retail establishment, or in any advertising or promotional materials, state or imply that the food is “natural” “naturally made”, “naturally growth”, “all natural” or any words of similar import...”

Our analysis of this provision was limited to estimating the cost of relabeling the affected products. We looked at cost data developed for 2011 FDA regulations on labeling animal foods, which estimated that the cost to change a label was \$1,300 to \$3,700 per SKU.²⁹ We estimated that the cost of relabeling the 25,000 products advertised as “natural” would be \$33 to \$93 million statewide. However, these are one-time costs; when the costs are spread out over five years, the annualized cost to California consumers would range from \$8 to \$23 million (Figure 4-8).

Figure 4-8

**Scenario 4 –
Cost of Relabeling Foods Branded as “Natural”**

	Range of Label Change Costs Only	
	Low	High
Total One-Time Cost	\$33 million	\$93 million
Annual Rate*	\$8.2 million	\$23.4 million
Annual Per Household Cost	\$1	\$2

* Assumes that manufacturers will amortize the cost over 5 years at an 8% discount rate.

It is important to note that while relabeling over 25,000 “natural” items does not present a significant cost per household, relabeling is only a small portion of the cost of rebranding an item that was previously advertised as “natural.” Changing advertising campaigns for thousands of products in print, television and on the internet for a California-specific market to comply with the Initiative will cost millions more statewide. In addition, we assume that removing “natural” from packages and marketing materials for a California market alone would have a negative effect on product sales in the state, especially for those products with “natural” (or similar terms) in their names.

Labeling Costs

Another path the industry may take is to label all food containing GE ingredients above the thresholds. As experience in the EU indicates, it is unlikely that many manufacturers would pursue this approach, because of concerns over the confusion that labels would produce for consumers. Also, with competitors substituting non-GE ingredients, we expect competitive pressures would lead many producers to follow suit.

The direct cost of this scenario is much lower than the substitution scenarios, although the industry cost would range from \$300 million to \$800 million statewide. These costs do not, however, consider the market impact of labeling products instead of changing how they are manufactured (*i.e.*, the potential loss of market share).

The experience in the EU and the proponents' characterization of these labels as the "kiss of death" for a brand indicate that this option is unlikely for now. However, as several experts have indicated to us, achieving a 0.5 percent threshold is substantially costlier than the higher thresholds found elsewhere in the world and a 0 percent threshold is effectively impossible. As a result, more manufacturers may choose to label their products starting in 2019, when the Initiative calls for the GE threshold to drop to 0 percent, simply because achieving that level of identity preservation is cost prohibitive or practically impossible.

Limitations

- The cost estimates only capture likely compliance costs over the short to medium-term – between the date of enactment and 2019 when a zero percent threshold goes into effect for GE ingredients in selected foods.
- Longer-term impacts on the food supply are very difficult to predict at this time. We would expect that food companies would:
 - Make greater use of organic inputs to take advantage of the organic exemption; that is certainly the hope of the organic food industry, which is strongly supporting the Initiative's passage.
 - Reformulate some foods to shift away from ingredients with GE characteristics (*e.g.*, substitute palm oil for corn oil), but determining the cost impacts of those reformulations is beyond our ability to predict. To some extent, manufacturers already do this with certain ingredients, listing multiple oil types on labels so that they can switch based on market conditions. It would not be possible for all foods to be reformulated in this way, however, as many ingredients have particular properties that, if changed, would alter the product.
- The significant impacts that GE crops have had on lowering pesticide use, improving yields, and making farming more profitable for farmers would likely dissipate. This would have significant economic and environmental implications that are not considered here.
- Analysis of the full impact of the prohibition on the word "natural" associated with a wide range of processed foods is not within the scope of the analysis.
- Impacts on California farmers are not identified specifically in this analysis.
- Legal costs associated with defending products and companies against bounty-hunter lawsuits are highly uncertain and likely to be significant. We have included paperwork and tracking costs under Scenario 2 to create paper trails to document the use of non-GE ingredients, but these costs do not capture the highly uncertain and potentially enormous costs of litigation.

- Government compliance costs are not included in our analysis. The costs to enforce this complex and unprecedented legislation would place a significant burden on the state from development of regulations to enforcement.
- Transportation costs throughout the supply chain are not included in our analysis. Dedicated transportation or clean-up procedures for trucks, rail and wagons transporting non-GE ingredients and foods will likely be required. This will require substantial expenditures in transportation and storage infrastructure and/or extensive cleaning of these facilities between shipments.
- The costs and limitations of testing are not included in our analysis, and could add substantial costs to the implementation of this Initiative. The most sensitive tests can detect GE presence at a 0.01 percent threshold, but quantitatively identify GE presence at 0.1 percent or higher. These thresholds can also vary from lab to lab, and the ingredients and foods would require to be tested – often multiple times – at every step of the supply chain. There are no tests at this time that could confirm 0 percent GE presence, as would be required by the Initiative to avoid labeling of non-exempt foods in 2019.
- This study only addresses the potential impacts related to food and beverages for human consumption. It appears, however, that the Initiative may also apply to pet foods, given the definition of food in California’s Sherman Food, Drug, & Cosmetic Act. Our analysis does not include what could amount to significant cost impacts on pet food manufacturers and California pet owners.

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