



Food Product Composition, Consumer Health and Public Policy

*A conference organized by Farm Foundation and USDA's Economic Research Service
Berkeley, Calif. April 9-11, 2007*

Executive Summary

The number and variety of foods for sale every day in the United States is enormous. More than 300,000 products are available at any one time. The number of new food product introductions averaged more than 10,000 items per year throughout the 1990s. With food options ranging from cage-free omega 3 eggs to Cajun-style pork rinds, the American diet choice set is wide.

The breadth of food choices can, however, mask overarching similarities in the composition of the U.S. food supply, including frequently used ingredients in processed foods or standard production practices. Common formulations can have wide-spread effects on the diet quality and health of large sections of the population. As concern about the healthfulness of U.S. diets grows, consideration is needed of how agricultural and food policies may influence diet quality through effects on food product composition.

The April 2007 conference, *Food Product Composition, Consumer Health and Public Policy*, explored the role of policy in inducing changes in U.S. diets through shifts in food product composition. Case studies on sugar, trans fats, dairy, whole grains, and salt offered examples of the unintended effects of farm income and price policy, as well as effects of policies directed specifically at improved nutrition. The cases were selected to highlight the impact of different kinds of policies, and to explore the importance of policy in motivating behavioral change. A goal of the conference was to identify where and how policy might be used in the future to improve U.S. diets. Ten key observations emerged from the discussions.

1. Two main types of indirect policies—those affecting input costs and those affecting competition—have influenced recent shifts in food product composition.

Policy directly regulating product content, such as the New York City ban on trans fats, has a direct impact on product composition. The focus of the conference, however, was on policies that do not directly regulate food ingredients or technologies, but have nevertheless had an important impact on the composition of the food supply. Conference participants identified two types of policies at the heart of recent shifts in food product composition in the United States: policies affecting food manufacturers' input costs and information policy affecting competition.

Policies affecting input costs include such farm policies as farm-income support programs and commodity-price supports, public funding for research and development in commodity production, and trade policies such as import quotas and tariffs. Information policies include labeling and nutrition education programs. Conference participants identified a number of other possible examples of recent shifts in food product composition that may have been influenced by these two types of policies. Table 1 provides an overview of the product composition shifts discussed at the conference.

Table 1. Food Product Composition Change and Public Policy

Composition Shift (documented, hypothesized, or targeted)	Possible Policy Impetus
<i>Policies Affecting Input or Technology Costs</i>	
Increase in high fructose corn syrup in processed foods (case study presented by Helen Jensen)	Sugar and corn price policies over the past two decades Sugar quotas
Increase in low-fat milk consumption and in lower fat Italian cheeses (case study presented by Brian Gould)	Milk marketing order pricing change in 2000 that sets incentives for fat content; Dairy quotas in trade.
Pork and beef have less fat now than twenty years ago	Grades and standards; Check-off supported research to improve meat quality
<i>Information Policy</i>	
Reduction of transfats in processed foods (case study presented by Laurian Unnevehr)	Transfat added to mandatory nutrition label in 2003
Increase in whole grains in processed foods (case study presented by Lisa Mancino)	Dietary Guidelines in 2005
Salt content in processed foods (conference panel)	Mandatory nutrition labeling starting in 1995
Low-fat trend product introductions increased in the 1990s	Dietary Guidelines emphasize moderation in fat consumption; mandatory nutrition labeling

2. Policies affecting input costs do not have large effects on retail prices or consumer demand.

The effects on food consumption patterns of policies affecting commodity input costs are not due to effects on final retail prices and consumer demand, particularly with respect to highly processed foods. The more processed the food, the lower the percentage value accounted for by the raw commodity. In the case study on sugar and high fructose corn syrup (HFCS), Dr. Helen Jensen and Dr. John Beghin presented estimates of the effect of changes in sweetener cost on final retail prices. They found that the link between farm and retail prices is not very strong, particularly in recent years. In the dairy case study, Brian Gould discussed the dramatic shifts in

dairy product demand that were not reflected in milk prices, even though the milk pricing formulas were changed in 2000 to better reflect market demands.

Given the weak link between commodity price changes and retail prices, conference discussions centered on the limited ability of commodity policy to influence retail price and consumer choice. Participants also stressed the regressive nature of using any policy that raises food prices, which would need to be dramatic given the inelastic nature of U.S. food demand. That is, lower income households would have a proportionally higher and possibly unacceptably high tax burden for any tax large enough to alter consumption patterns.

3. Policy can influence food composition without first influencing consumer preferences.

U.S. producers and manufacturers are responsive to consumer demand and the types of products available for consumption reflect consumer preferences. This observation does not imply, however, that consumer demand drives all changes to the food supply. In fact, consumers may not even be aware of many reformulations or processing changes, particularly when taste and price remain unchanged.

Farmers and manufacturers can translate consumers' demand for taste, convenience and nutrition into an almost limitless variety of products. Input and processing costs—and policy affecting these costs—can play a major role in influencing the content and quality of the final mix of food products. Commodity support programs, tariff policy or food safety requirements can all affect input prices or production practices and trigger shifts in the content and quality of the food supply.

The shift from sugar to high-fructose corn syrup in U.S. processed foods is a good example of policy affecting product composition by changing relative input prices. The sugar case study focused on U.S. corn and sugar farm income and price support programs. Historically these programs raised the price of sugar relative to corn, resulting in the development and widespread use of HFCS as a sweetener in processed food products.

Another historical substitution was the use of partially hydrogenated soybean oil to replace saturated fats from animal and tropical oil sources in processed foods. While this was partly in response to nutrition information, it also reflects the widespread availability and relatively low cost of soybean oil in the United States.

Even when consumers initially accept product reformulation, new or emerging information may lead consumers to reject specific ingredients or processes. Both HFCS and trans fats have come under scrutiny for their health effects after a decades-long trend of increased use of these ingredients.

Nutrition education and information policy, such as labeling requirements, can also influence food composition without first influencing many consumers' preferences. New labeling regulations can prompt manufacturers to pursue a number of long-run competitive strategies that are only peripherally related to current or future consumer demand for the labeled attribute. These strategies are discussed in more detail in the section on information and new areas of competition.

4. Policy affecting inputs and processing could have far-reaching and unintended consequences .

The dairy pricing case study highlights the potential for price and market policies to influence product composition. Dairy pricing formulas are complex and have been revised twice in the last decade. At issue is the ability of prices to translate consumer preferences into farm level incentives. Current pricing formulas do not reflect the contemporary composition of dairy product demand, specifically the growth in demand for relatively low fat mozzarella-type cheeses or the development of new uses for whey by-products. The ability of producers to alter the characteristics of milk may have limits, but these have not been tested due to the lack of price incentives to do so. In fact, pricing formulas have tended to sever the link between consumers and producers so that the final mix of food products does not reflect either consumer preferences or the most efficient use of producer resources.

Another example is the use of salt in processed foods as a preservative and retardant for microbial growth. Despite health concerns, more stringent regulation of *listeria* in meat products may have discouraged salt reduction in processed meat products.

5. Information policy can create new areas of competition.

Information policy such as labeling regulations and nutrition information can create new areas of competition by raising consumer awareness and stimulating demand for new product attributes. Manufacturers and producers will reformulate as early as possible to capture first-mover profits. Such reformulation will occur even if many consumers are unconcerned about the health attribute in question. Thus, all consumers will see a change in diet composition, whether or not they were specifically seeking change. The 1980s information campaign regarding bran content of breakfast cereals is one example.

Information policy stimulates competition for marginal consumers, particularly when manufacturers determine that they can reformulate to cater to the preferences of a very small group of consumers without alienating their core group of consumers. The more attributes manufacturers can “stack” in their products—eco-friendly, low-sugar, fair-trade, high-fiber—the more niche consumers they can attract. This strategy works best when the new ingredient or attribute does not affect taste or price.

Lisa Mancino’s case study of the whole grain recommendations in the 2005 Dietary Guidelines for Americans showed the recommendations triggered an explosion in whole-grain products and labeling, despite the fact that many consumers did not exhibit any desire for more whole grain options or any knowledge of the new recommendations. Mancino estimates that in 2003, Americans consumed 10 servings of grains, with whole grains accounting for a little more than one serving. In food intake surveys from 1999-2000, nearly 40 percent of Americans did not report eating any whole grains in an entire day. Yet after the 2005 release of the new Dietary Guidelines for Americans, numerous manufacturers changed their product formulations and introduced new whole-grain products. Few Cocoa Puff consumers can detect a difference between regular and “whole grain” varieties. Evidently, General Mills is assuming that the whole-grain allure of reformulated Cocoa Puffs will attract new consumers but not push away very many of their old ones.

Likewise, transfat labeling requirements led to major reformulations to capture the marginal consumer interested in this health attribute. Prior to recent media attention to trans fats, most consumers were unaware of this issue. Yet reformulation of processed products on grocery shelves has been underway for a decade and the food service industry has been testing alternative fry oils. With the implementation of mandatory transfat labeling in January 2006, and the December 2006 New York City ban on trans fats in food services, industry has increased the visibility and pace of efforts to find substitutes.

Manufacturers may also choose to reformulate as part of a strategy to build brand reputation. Well-advertised investments in new “healthy” ingredients and processes can improve a brand’s image with consumers. These investments build the brand’s reputation for wholesomeness, healthfulness and social responsibility. Examples of this strategy were noted in the salt and whole grain case studies—Campbell’s heavily advertised their low sodium line though it accounts for only small part of product line, and General Mills’ widely advertised their whole grain shift. Manufacturers may also reformulate and adopt expensive process changes in an effort to raise de facto industry quality standards to create effective barriers to entry. Campbell’s investment in salt substitute research and Wendy’s early announcement of no trans fats in their food service may be examples of this strategy.

6. Competition over health attributes may not result in healthier foods.

Whole grain and transfat case studies illustrate that substitute ingredients or reformulated products may not be any more healthful than the products they replace. Whole grain reformulations are not regulated, and it is often unclear what “whole grain” claims on food product labels indicate. An effort to develop a private standard for such labels may or may not succeed in providing better information and product formulation to consumers. This case demonstrates the limitations of current information policy with respect to this health attribute.

In the case of trans fats, substitution possibilities are limited to saturated fats in many of the most important sources of trans fats in the diets—specifically pastries and cookies. Food label data indicate that relatively healthful oil substitutes have been used in chips, while less healthful substitutes dominate in reformulated cookies. Many of the more difficult reformulations required considerable adjustment time to achieve. The process of finding substitutes is ongoing, but whether it ultimately results in greater consumption of saturated fats is still unclear. Industry and consumer “fatigue” for reformulation and fats-related health claims may set in.

Foods successfully reformulated to avoid one particular ingredient may still not be healthier overall if the reformulation includes the addition of ingredients that diminish the nutritional profile of the food. Mancino discussed possible increase in sugar, salt or fat to increase palatability of whole grain foods.

The use of food icons or other front-of-the-package healthy labeling such as “heart healthy” or “double health checks” could spur competition over healthy attributes, but the ultimate effect on diet quality depends on whether the reformulated product is actually healthier than the one it replaces. In addition, reformulated “healthy products” could produce a halo effect where consumers eat more of the product than is part of a healthy diet. Mancino discussed the potential

for the “Snackwell Phenomenon” with respect to whole grains—i.e. consumers think they can eat unlimited quantities of the food because it is “healthy.”

7. The extent of reformulation depends on the adaptability of production practices, with implications that extend all the way through the supply chain.

The extent of reformulation—whether triggered by input cost changes or information policy—depends on the ability of existing production practices to accommodate the input or processing change. Short-term, there may be few effects on product composition if the cost of adapting existing processing methods to the new input exceeds projected cost savings.

In her case study, Mancino discussed both farm-level and plant-level constraints to increased whole-grain wheat production. At the farm level, the shift from red winter wheat to the more palatable white winter wheat may take a season or two, or it may not be possible in some areas of the country. White winter wheat varieties developed for specialized whole grain use in processed products also require longer term plant breeding efforts. At the plant level, some machinery cannot handle the corrosiveness of whole grain processing.

In the trans fat case study, both technical processing issues and farm level supply response were at issue in making the reformulation. Reformulation has meant designing and investing in new equipment as equipment to make processed food products was designed for the texture and stability of the trans-fat-containing oils. New soy and canola crop varieties with more desirable oil characteristics, such as greater stability, have been developed, speeded by the tools of modern biotechnology. Building up a reliable supply of these new varieties takes time, with a three-year planning horizon required to meet any new source of demand from the food industry. In this case, the competition to reformulate stimulated new incentives through the supply chain all the way back to the input market for seeds.

Over time, as the capital stock depreciates, machinery designed to process the new input will come on line and the benefits of lower-cost inputs or expanded demand for niche attributes will be realized. Since the rate of depreciation depends on such market conditions as interest rates and returns to production, changes in market conditions will influence the economic lifespan of capital investments. Changes in relative prices and or new market opportunities can shorten the economic life of some investments and breathe life into others.

Jensen and Beghin discuss the effect of U.S. ethanol policy on the relative price of sugar and HFCS. As increased demand for corn for ethanol drives up the price of HFCS, sugar becomes a more attractive input option. However, manufacturers who invested in high-tech machinery designed to efficiently process HFCS cannot easily change to sugar. Only those producers still using older machinery, like many in Mexico, can switch easily between sugar and HFCS. This rigidity in processes is now reflected in a weaker link between farm level prices of sweetener sources and food product prices, making price policy an inefficient lever for future reformulation change.

8. Publicly supported agricultural research has played a role in product composition.

The case studies and other discussion highlighted the role of research in supporting private investments in product composition change. Breeding programs for both low linoleic soy

varieties and white winter wheat varieties adapted to specific uses drew in previous publicly-funded research to identify desired processing characteristics. Publicly supported research on agricultural commodities has favored technological progress in corn production relative to sugar, and led to lower relative prices for corn. The fall in corn prices relative to sugar prices benefited users of corn, for example in HFCS and in feed, and increased costs for consumers of sugar. Development of new uses for whey byproducts from dairy is a result of publicly-funded research, and brings a new dimension to dairy pricing and returns to milk composition that may offset any reduced value for fat in the marketplace. An important case not discussed at the conference, the change in fat composition of pork products, was the result of research supported by the pork industry check-off program, a mechanism for research support created by federal agricultural policy.

9. Taste determines the success of any change in product composition.

Taste is the 800-lb gorilla in the corner of any discussion of nutrition policy and product reformulation. For any healthy product reformulation to succeed, it must also taste good. Manufacturers will not adopt a price-saving input or technology if the final product does not taste good. This is illustrated by the search for replacements for partially hydrogenated oils in the food service industry. Fry oils must not only be stable so as to reduce the need to replace them, they must also convey the right taste, texture and mouth-feel. Fast food vendors don't want to lose customers by reducing perceived product quality. For example, some substitute oils may give a product the right taste, but the product will feel too "greasy." The right fry oil will vary for different fast food products. Finding the right blend to meet the needs of particular food service chains is a complex undertaking.

In some cases, even the suggestion that something will not taste good is enough to constrain the development—or advertisement—of a new product. Many consumers dislike the taste of low-salt products and will systematically avoid purchasing anything so labeled. To avoid this reaction, Campbells and Mars have not touted the gradual reduction in salt in the majority of their soup lines.

10. New areas for research.

The complex linkages between agricultural and food policies and long-term health outcomes from diets is a relatively understudied area. Agricultural economists can help address such questions for the agricultural and food system, including:

- Why are some information policies highly effective, while others are not? Saturated fat content has been on food product labels since 1993, yet U.S. consumption of this nutritionally undesirable food product component has not declined. Meanwhile, a push to eliminate trans fats, motivated by labeling policy, appears to be highly successful.
- What kind of summary icons might best succeed in creating market incentives for healthier foods? A focus on individual product ingredients may or may not result in overall healthier diets, and may lead to consumer confusion. Individual companies and the grocery industry as a whole have developed summary icons to indicate healthful choices. Will such icons serve consumers' needs, especially as understanding increases about individual nutritional profiles? Will icons bring about competition to provide more healthful products?

- How will agricultural and market price policies influence product composition in the future? As agricultural policies are decoupled from production decisions and input prices become even less important in food prices, how will agricultural policies influence diets? Both the sugar and dairy case studies demonstrated that agricultural policies have played an important role in the past, but in the future may play a more limited role influencing diets and diet composition.
- How does market structure influence the impact of policies on diets? The food service industry is an important source of calories consumed in the United States, but most policies have not applied to this industry. Does the importance of this industry argue for its inclusion in policy initiatives?
- How can agricultural research support healthier diets?
- How can tracking and understanding of food product composition changes be improved? The information used to translate product consumption into dietary components is maintained and updated by USDA's Agricultural Research Service. This difficult and expensive data transformation remains an important foundation for research. Yet it may not be able to keep pace with rapid changes in formulations. One possibility is for an industry/government partnership to create a database to record nutrition label information provided on products, giving researchers a basis for understanding the directions of change in food product reformulation.