

Chapter 17

How Government Policies and Regulations Can Affect Dietary Choices

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Regulations—regardless of whether or not they are directed specifically at the food sector—can affect the varieties and qualities of foods available for purchase, the prices consumers face, the information consumers receive about a product, and consumer confidence in the food supply. This chapter reviews four important categories of policies and regulations—farm assistance programs, food safety regulations, information regulations, and regulations covering other sectors—and their potential impacts on consumer dietary choices.

Introduction

Policies and regulations that directly or indirectly affect the supply or prices of food products, their safety and nutritional composition, or the information consumers receive about food all influence the food choices consumers make and, ultimately, the nutritional quality of their diets. The effect of policies and regulations on ultimate dietary choices depends on how the policy affects the cost of producing commodities, how those costs relate to final retail prices, how responsive consumers are to price changes, and how the policy directly influences the consumers' preference for the product.

This chapter reviews four important categories of policies and regulations that affect the food sector, and discusses their potential effects on consumer dietary choices (table 1, p. 358). While there are no comprehensive studies on the quantitative effects of these regula-

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tions, several examples in each category illustrate the types and magnitudes of these effects. The first category—farm assistance programs—includes Federal price and income support programs as well as producer-funded marketing orders and research and promotion agreements. The price and income support programs have historically affected the marketed supply of many foods, although many provisions were suspended in 1996. Some marketing orders set quality standards for marketed supplies of foods, and promotion programs attempt to influence demand for commodities through generic advertising (see also chapter 10). The second category—food safety regulations—includes inspections of processing plants and food products, approval of food additives, and restrictions on pesticide use and animal drugs. These regulations can affect food prices or availability, and their implied assurance of safety is information that can also affect demand for the food. The third category—information regulations—includes labeling requirements and advertising restrictions, standards of identity, and product grades. These directly influence the kind of information consumers receive about foods, and therefore affect their demand for foods. The fourth category—regulations covering sectors other than agriculture—includes environmental requirements and worker safety, restrictions on mergers, and trade policies. These regulations also may affect the price and/or availability of specific food products.

Most of these policies have little real effects on dietary choices overall, partly because consumer responsiveness to resulting price changes is low. Yet the regulations have been shown to affect some individual foods or population groups, significantly in some cases. Keep in mind that increased consumption of a particular food may or may not be nutritionally desirable, depending on its own nutritional qualities, its substitution effects, and any increase in complementary foods. For example, lower prices of ground beef may increase consumption of hamburgers as well as other complementary foods, such as buns, ketchup, and potato chips (see chapter 8).

Many other government regulations and programs not covered in this chapter also affect food choices. In addition to the food assistance programs described in chapter 16, changes in welfare assistance regulations can increase or decrease household income and thereby affect consumer food choices. The types and amounts of government-funded research can also affect dietary choices by determining the areas of interest and the focus of research. For example, research conduct-

ed by the U.S. Department of Agriculture's (USDA) Agricultural Research Service led to the development of Oatrim, a fat substitute made from processed oat fiber that has the additional benefit of lowering blood cholesterol levels. Oatrim has the potential to provide consumers with tasty lower fat products and a wider range of choices.

Farm Assistance Programs

Federal and State price support programs for wheat, rice, feed grains, oilseeds, milk, peanuts, and sugar are intended to stabilize and/or support prices and, in some cases, producer incomes for these commodities. In addition, producers of milk, fruits, vegetables, and specialty crops are permitted to organize marketing orders to facilitate orderly marketing. Finally, several commodities are also covered by federally authorized research and promotion agreements.

Federal Price and Income Support Programs

Introduced with the Agricultural Adjustment Act of 1938, partly in response to the Great Depression, price and income support programs have been modified several times. Programs have combined several forms of assistance, including deficiency payments to cover the gap between target prices and market prices, (nonrecourse) loans to farmers that could be defaulted if prices fell below a specified level, government purchases of surplus production to support prices, short- and long-term programs paying farmers to idle certain land from production at a targeted level and limiting acreage planted to certain crops (the Acreage Reduction Programs and the Conservation Reserve Program), export subsidies, and import restrictions. Many of these provisions were eliminated or suspended with the 1996 Farm Bill.

While some of the programs did raise farm commodity prices, consumer dietary choices were affected very little. Farm prices are a fraction of final retail prices, and consumer responsiveness to price changes for most foods is low. For example, the peanut program was estimated to increase peanut prices to 27 percent above the break-even price (Sanford and Evans, 1995). However, the farm price of peanuts represents only about a quarter of the final retail price of peanut butter (Elitzak, 1997). Thus, even if the whole price increase had been passed on to consumers, the price of peanut butter would have risen only about 7 percent ($0.27 \times 0.25 = 0.7$). Because con-

sumers are not very responsive to the price of peanut butter, the actual effect on peanut butter purchases would have been much lower than this percentage. The price elasticity of demand (percentage change in demand resulting from a 1-percent change in price) for nuts (peanuts and tree nuts together) is only -0.16 (Huang, 1993). If consumers have the same price response to changes in the price of peanut butter,² then a 7-percent increase in the price of peanut butter would result in a 1.1-percent decline in the quantity of peanut butter purchased ($7 \times -0.16 = -1.12$). Researchers have also found that price impacts of the sugar and wheat programs on consumption are 1 percent or less for sugar (Uri and Boyd, 1994) and for wheat (Hoffman and others, 1995).

Similarly, the feed grain program raised feed costs for meat, milk, and egg producers, but the effects on consumption of the final products were probably very minor. Price elasticities of demand for milk and eggs are low (-0.04 for fluid milk, -0.11 for eggs) (Huang, 1993). Even consumption of beef, which is more sensitive to price changes (price elasticity of demand = -0.62), probably was not greatly affected, because feed grain costs are a fraction of the costs of producing beef, and the farm price is only about half of the final retail price. Further, the increase in feed grain costs would have increased costs for pork and poultry as well; the price elasticity of demand for all these meats together is even lower than for beef.

Consumer prices for fluid milk were higher than they would have been without milk price supports before phaseout of supports began in 1996. Because consumer response to price changes is low, however, supports probably reduced consumption less than 1 percent (Blayney and others, 1995). Milk and milk products, such as cheese and butter, are also affected by Federal milk marketing orders, which are under reform as part of the 1996 Farm Bill but still in operation. Federal milk marketing orders establish regional price differentials for different classes of fluid grade milk in different regions of the country (Manchester and others, 1994).

The milk marketing order system historically resulted in below-market prices for most manufactured dairy products (Blayney and others

² The “nuts” category in Huang’s estimated demand system is dominated by peanut butter, so this price elasticity is an acceptable approximation of the elasticity of demand for peanut butter.

1995), which could continue under current reforms. Below-market prices for manufactured dairy products can occur when the pricing structure creates an incentive to produce a surplus of milk above fluid demand; the excess milk is then available for use in the manufacture of dairy products, resulting in greater supply and lower market-clearing prices for these products.

Because some manufactured dairy products, such as cheese, are high in saturated fat, some nutritionists have expressed concern that lower prices for cheese may lead to higher cheese consumption, contributing to increased saturated fat in the diet (Sims, 1998). However, while consumers respond more strongly to the price of cheese (elasticity = -0.25) than to the price of fluid milk (elasticity = -0.04) (Huang, 1993), the response to the cheese price is still low. Taking into account the full complementarity among foods, the net effect of a 10-percent reduction in the price of cheese is only a 0.74-percent increase in saturated fat intake, equivalent to 0.37 gram of saturated fat per capita daily (Huang, 1997).

While commodity programs have had minimal effects on dietary choices of the population as a whole, the distribution to low-income individuals of surplus commodities that result from some of these programs has been shown to have an important impact on dietary choices for that group. For example, in the 1980's, the dairy support program resulted in a buildup of surplus cheese; the surplus was donated directly to low-income individuals under The Emergency Food Assistance Program (TEFAP), roughly doubling the consumption of cheese for this group (Zellner and Morrison, 1988). While cheese is the most extreme example, consumption of other commodities has been affected in some years by surplus distribution programs. For example, USDA purchases of surplus peanut butter for TEFAP accounted for 6.5 percent of U.S. retail volume of peanut butter in 1992/93;³ this was nearly half as large as the largest percentage of cheese marketings accounted for by USDA purchases—15 percent in 1983 (Blayney and others, 1995). Thus, while data on the number of recipients and their usual peanut butter consumption are not avail-

³ Government purchase data from USDA's National Agricultural Statistics Service (NASS), various issues. Breakdown of peanut butter purchases by program provided by Bonnie Taylor, USDA's Food and Nutrition Service. Data on total U.S. consumption of peanut butter from Sanford and Evans, 1995.

able, this volume of peanut butter could have significantly increased peanut butter consumption for low-income consumers that year.

The 1996 Farm Bill eliminated or began to phase out many program components, continuing the reduction in the Government's influence in the agricultural sector through traditional commodity programs (Young and Shields, 1996; Young and Westcott, 1996). The 1996 Farm Bill suspended price-dependent income support payments for wheat, rice, and feed grains, and limited price supports for these crops as well as for sugar and peanuts. Dairy price support levels were cut back and will be eliminated in 2000, while Federal milk marketing orders are to be reformed by consolidating the number of orders and by considering changes in how classified prices in the new orders are to be determined. The short-term Acreage Reduction Programs were eliminated, while the longer term Conservation Reserve Program was reoriented to provide additional environmental benefits. The changes in the Conservation Reserve Program continue the expansion of priorities from erosion to include improvements in wildlife habitat and air quality.

Just as these programs have had minor effects on consumer choices, the 1996 changes are believed to have had very small impacts on dietary choices because retail prices for food are only marginally different (Young and Westcott, 1996). While retrospective studies are not yet available, prices were projected to be about 1 percent lower on average for dairy products and slightly lower for peanuts. Prices were projected to be slightly higher for rice due to the elimination of deficiency payments, which created an incentive to overproduce without corresponding supply control. Prices of foods based on grains—including meats, as well as cereals and bakery goods—were projected to be unchanged. Overall livestock feed costs were projected to be similar to those under previous legislation, although the mix among feed grains and forage may be different. While wheat prices were projected to drop, ingredients are a fraction of cereals' and bakery goods' retail cost. Availability of fruits and vegetables is not affected by these changes because payments are reduced for fruits and vegetables planted in excess of their historical plantings on farms with a production flexibility contract. Programs distributing commodities to low-income households, however, will probably be greatly affected with the reduction in price support purchases of surplus commodities. Expenditures in 1996 for the TEFAP, for example,

were 50 percent lower than in 1995 (USDA, Food and Consumer Services, 1996).

Marketing Orders for Fruits, Vegetables, and Specialty Crops

Federal marketing orders for fruits, vegetables, and specialty crops are self-help commodity programs proposed, governed, and financed by commodity industries and authorized by Federal legislation (Neff and Plato, 1995). In contrast to Federal marketing orders for milk, marketing orders for fruits, vegetables, and specialty crops operate with no direct price controls and limited quantity control. Fruit, vegetable, or specialty crop marketing orders may limit the total marketed quantity, the flow among market segments, or the flow over time to stabilize or increase prices. They may also set quality standards and container/pack standards to increase demand through quality assurance and/or to restrict supply. They currently include oranges, grapefruit, tangelos, limes, avocados, nectarines, peaches, kiwifruit, apricots, cherries, fresh and dried prunes, grapes, pears, papayas, cranberries, olives, potatoes, onions, tomatoes, melons, almonds, hazelnuts, walnuts, spearmint oil, dates, and raisins. Additional commodities are covered by State marketing orders.

Direct quantity control provisions are used in only a few marketing orders for specialty crops—such as certain nuts, specific berries and dried fruits, and spearmint oil—with minimal impact on dietary choices. The strongest supply control tools available in marketing orders are producer allotments and reserve pools. Producer allotments assign a maximum quantity a handler can market from each producer in a single season. The total quantity allowed can increase based on increased demand, but prices are maintained by the control of supply in each season. These provisions are authorized only for cranberries and spearmint oil. Reserve pools withhold marketable supply if total supply exceeds estimated market demand at a given price. The surplus can be released later or diverted for sale in a secondary food market (such as frozen or processed) or for nonfood use. Reserve pools are allowed only for California walnuts, Far West spearmint oil⁴, California raisins, and California dried prunes. Market allocations, used in four marketing

⁴ The Far West spearmint oil order covers Washington State, Idaho, Oregon, Nevada north of 37th parallel, and Utah west of the 111th meridian.

orders (California almonds, Oregon-Washington hazelnuts, California walnuts, and California prunes), specify the maximum quantity that can be sold for a given use, thus increasing revenues by limiting the supply of product going to the market segment that is less responsive to price. Markets can be separated into fresh and processed or domestic and export, for example.

Minimum quality standards are part of almost all marketing orders, and may limit the marketed supply of some commodities.

Consumers willing to purchase lower quality produce at lower prices may be priced out of the market by quality controls. This could be especially relevant to the dietary guidelines because fruits and vegetables are an important component of the guidelines, and because consumers are more responsive to the prices of fruits and vegetables than to other food groups. However, minimum quality standards also appear to have increased demand by standardizing quality at a high level (Neff and Plato, 1995).

National Research and Promotion Programs

Many marketing orders authorize research and promotion programs, and some such programs operate outside of marketing orders.

Assessments on producers, processors, and often growers and handlers, fund research to improve grower/handler efficiency and consumer research for use in marketing and generic advertising.

National research and promotion programs are authorized for beef, dairy, eggs, honey, mushrooms, popcorn, pork, potatoes, soybeans, watermelons, and wheat. Many other commodities are covered by State programs.

Recent research on the effects of beef advertising are mixed. Some researchers have found no impact from generic beef advertising, but positive effects from branded advertising (Brester and Schroeder, 1995). Ward and Moon (1997), on the other hand, found that generic advertising may have increased beef consumption by as much as 8 percent. Studies have suggested strong effects of generic advertising on demand for Washington apples (14.5-percent increase) and catfish (13 percent), and lower effects for orange juice (2.7 percent) (Forker and Ward, 1993). Even when effects on individual commodities are large, the effect on diet quality is less clear. Increased consumption of one commodity may displace another commodity in the same group. The effects of dairy promotion are discussed in chapter 10.

Food Safety Regulations

Programs to ensure consumer safety include food safety inspections, pesticide use and residue restrictions, animal drug approval, and food additive approval. Since the relative safety of a food may be unobservable to consumers, they are unable to give producers sufficient incentive to spend money providing these qualities. Food providers who invest more in technology that enhances food safety may have higher costs of production and be unable to increase prices or use increased safety as a selling point because consumers cannot verify that the food is safer. Thus, producers who provide safer goods are sometimes penalized. Further, when the risk of foodborne pathogens or other hazards undermines confidence in the food supply, the economic harm is not limited to providers of unsafe food but extends to all food providers. Regulations that ensure an acceptable level of safety reassure consumers and level the playing field for producers.

Food safety regulations could have two possible effects on dietary choices. On the one hand, the cost of meeting higher standards could either increase prices or reduce availability of certain foods, thus decreasing consumption of those foods. On the other hand, ensuring the safety of the food supply probably increases demand for many foods that consumers might otherwise avoid due to health concerns.

When a well-publicized outbreak of foodborne illness occurs, consumer confidence in the safety of the food product can temporarily deteriorate, leading to a drop in sales. For example, the outbreak of *E. coli* 0157:H7 resulting from undercooked fast-food hamburgers in Washington State caused a decline in demand for hamburgers from that chain (Knutson and others, 1995), although sales have steadily recovered (Foodmaker, Inc., 1998). Similarly, demand for strawberries and raspberries reportedly dropped temporarily after the outbreaks of Hepatitis-A linked to strawberries in 1997 and *Cyclospora* linked to raspberries in 1996 (Zepp and others, 1998).

Consumer confidence in the safety of the food supply can also be undermined by concerns over health effects of pesticide residues. In contrast to the more isolated nature of concerns about foodborne pathogens, concerns about pesticides may be ongoing and have a spillover effect on other fruits and vegetables. For example, 8 percent of California consumers reported reducing their consumption of

fruits and vegetables in response to pesticide concerns (Bruhn and others, 1992).

Consumers' reactions to food safety problems may also provide evidence of their overall confidence in the food supply. Consumers avoided hamburgers only from the fast-food chain linked to the 1993 *E. coli* outbreak, not all fast-food hamburgers. Similarly, consumers did not avoid all fruit following the Hepatitis-A and *Cyclospora* outbreaks. Concerns over pesticide residues appear to influence the dietary choices of a limited minority of consumers. This suggests that most consumers trust that the problems are isolated and their resolution assured.

Food Inspections

Most foods crossing State lines or imported from foreign countries are sampled for inspection by the U.S. Department of Health and Human Services' (DHHS) Food and Drug Administration (FDA), except for meat, poultry, and liquid egg products, which are inspected by USDA's Food Safety and Inspection Service (FSIS), and shell eggs, inspected by USDA's Agricultural Marketing Service (AMS).⁵ Retail establishments, restaurants, and food produced for in-state sale are inspected by State and local authorities, under nonbinding guidance from the FDA Food Code (U.S. General Accounting Office (GAO), 1990). Meat products inspected locally are required to meet standards at least equal to Federal standards, and local systems are monitored by FSIS. These agencies also regulate technologies used to ensure food safety.

FDA inspections. The Food and Drug Administration monitors the safety of foods in its jurisdiction by conducting inspections of products as well as processing facilities (Zepp and others, 1998). FDA conducts research on contamination detection and prevention practices and sets standards for enforcing Federal regulations and guidelines on food sanitation and safety. It also monitors the safety of the food system by inspecting manufacturing plants and feed mills producing medicated or nutritionally supplemented animal feeds that are part of the human food chain. FDA also has responsibility for ensuring the safety of imported fruits and vegetables. By law, imported products must meet the same standards as domestic goods. The bulk

⁵ FSIS inspects products containing over 3 percent fresh meat or 2 percent or more cooked poultry. Liquid egg products inspected by FSIS are sold in liquid form, frozen, or as dried egg products.

of FDA-regulated imports are cleared for immediate distribution based on the Agency's review of the shipment's records; these records include information on safety assurance practices maintained during processing of the food being shipped. If a problem is suspected, inspectors then physically examine the shipment or take a sample for laboratory analysis. Imports from a particular processor or an entire country can be detained or blocked until the problem is resolved.

In a recent case, imports of raspberries from Guatemala were blocked from March 1998 through August 1998 following the 1997 outbreaks of *Cyclospora* linked to the raspberries (DHHS, 1998). Because the organism is difficult to detect, the safety of incoming raspberry shipments could not be verified by testing. Thus, imports were blocked until the source of contamination could be identified and eliminated.

Such actions could well affect the availability of some fruits and vegetables, yet are essential to maintain confidence in the food supply. Foodborne disease outbreaks have been linked to both domestic and imported produce. Four of the 13 foodborne disease outbreaks linked to produce during 1990-96 were from imported produce, although the outbreaks from imported produce accounted for about two-thirds of the resulting illnesses (Tauxe, 1997). While the evidence on the risks of imported produce is limited, without strict enforcement of safety standards, imported produce could develop a bad reputation. This could have important effects on dietary choices, especially since imports account for an increasing share of all fresh fruit and vegetable consumption (Zepp and others, 1998).

FSIS inspections. FSIS monitoring covers all aspects of slaughter and processing for meat and poultry. Under the Federal-State cooperative inspection program, FSIS monitors State inspection systems for products that do not cross State lines. In about half of all States, FSIS conducts direct inspection because the State has chosen to end its inspection program or cannot maintain FSIS standards (GAO, 1990).

FSIS issued new regulations for meat inspection in 1996, requiring all federally inspected meat processing establishments to document standard operating procedures for sanitation and implement a food safety management system called Hazard Analysis and Critical Control Points (HACCP). This system requires identification and monitoring of critical control points in the process to ensure that

pathogens are not introduced into the process and to destroy or prevent the growth of pathogens that may be present. The regulations require the establishment to test for generic *E. coli* as an indicator of fecal contamination.⁶ The regulations also require FSIS to test for *Salmonella*, and require that the plant not exceed a legal tolerance for presence of *Salmonella*. The new requirements do not replace, but rather supplement, the previously established organoleptic inspection system—in which inspectors examine animals and carcasses for symptoms of disease and other abnormal conditions—by requiring additional microbiological testing and improved records of the plants' own food safety system (Crutchfield and others, 1997).

These regulations can have several effects on food choices. The new standards themselves impose costs on meat suppliers, and thus may add to the cost of the product. The minimum cost of just the new regulations themselves—developing new sanitation plans and HACCP plans, training costs, labor costs for monitoring the new systems, and *E. coli* testing—is projected to be 0.006 to 0.12 cent per pound of meat and poultry (Crutchfield and others, 1997). Any additional equipment or labor required to meet the microbial standards would add further costs. Costs per unit are expected to be at the higher end of the projected range for small-scale producers because those producers have higher fixed costs relative to their overall costs. Thus, the regulations could influence the variety of meat products available if small-scale producers are unable to comply with the regulations profitably. Small firms were not exempted from the new regulations, although they were given longer to comply.

Food Safety Technology Approval

The Federal Government also approves technologies for use in food safety assurance. For example, FDA approved the use of irradiation to rid fruits, vegetables, beef, poultry, grains, and spices of pathogens. FSIS developed regulations for the use of irradiation on poultry and beef. FSIS also certified a steam pasteurization technolo-

⁶ Generic *E. coli* are bacteria present in large amounts in the gut and fecal material of the slaughtered animal. Generic *E. coli* should not be confused with certain types of *E. coli*, such as *E. coli* O157:H7, which are very pathogenic at very low levels. Because it is so abundant in fecal material, generic *E. coli* is relatively easy to detect if there has been fecal contamination of meat that could also transmit harmful bacteria more difficult to detect.

gy as significantly reducing pathogens that may be present on animal carcasses after slaughter. The regulation of these approvals and certifications provides assurance to both food suppliers using the technology and end-use consumers that the technology is safe and effective. More recently, however, FSIS has dropped requirements for approval of specific pathogen reduction technologies, leaving firms free to use any technology to reach the standards for *Salmonella* contamination (Hudnall, 1998). This could reduce costs of slaughter and processing by giving firms more flexibility to use technology that fits the scale of their operations.

Food Additive Approval

FDA approves the use of additives in food to ensure that such additives—for example, colorings, synthetic flavorings, and preservatives—are safe for human consumption (GAO, 1990). Because these additives can play a large role in the appearance, palatability, and shelf life of foods, their approval or prohibition could have a significant impact on food choices and nutritional outcomes.

The approval process can be lengthy and expensive, thus slowing the availability of new additives and restricting development to those with sufficiently high potential profits. Yet the process also ensures consumer confidence in the safety of the food supply.

The recent case of olestra, a fat substitute, illustrates the potential magnitude of these effects. Olestra was approved in 1996, 9 years after the petition was first submitted (DHHS, 1996b). Olestra is the first fat substitute with the ability to withstand heat that has been approved by FDA for use in many popular baked and fried salty snack foods, such as potato chips and crackers. In the process of obtaining approval for olestra, Procter and Gamble submitted more than 150 studies on the effects of olestra in humans and animals (DHHS, 1996b). The studies indicated that olestra inhibits the absorption of some fat-soluble vitamins and other fat-soluble nutrients, and can cause some people to experience abdominal cramping and loose stools. In granting final approval, FDA required olestra to be supplemented with vitamins A, D, E, and K in order to compensate for the effect of olestra on the absorption of these vitamins. FDA also required products containing olestra to be labeled with information about the potential for gastrointestinal symptoms and the effect on nutrient absorption. In this case, the approval process functioned

together with labeling authority to make the additive available while ensuring the safety and confidence of the public. In spite of the labeling requirements for products containing olestra, some consumer groups have continued to express concern about the safety of olestra. The Center for Science in the Public Interest (CSPI) has petitioned the Federal Trade Commission to require warning statements as part of advertisements for products containing olestra (CSPI, 1996) and has asked FDA to remove the approval for olestra or require stronger warning labels on products containing olestra (CSPI, 1998).

The availability of nonfat snacks with flavor and texture similar to the original versions could have a considerable impact on dietary choices, although the net nutritional effect is uncertain. A survey by the Calorie Control Council—an association of low-calorie and diet food manufacturers—suggests that nearly two-thirds of the adult U.S. population consume low- or reduced-fat or reduced-calorie foods and beverages (DHHS, 1996b). Many of these consumers may wish to consume fat-free snacks in an effort to reduce fat and/or calorie intake. However, it is not certain that intake of fat and calories would decline as a result of fat-free snacks. Research suggests that some individuals may compensate or even overcompensate after consuming a fat-free product with higher fat and/or caloric intakes from other foods (Foltin and others, 1992; Shide and Rolls, 1995).

Pesticide Regulations

The Environmental Protection Agency (EPA) sets “tolerances” or limits on the amount of pesticide residue that can lawfully remain on food. FDA then tests nonmeat foods in order to enforce these residue limits. Prior to 1996, previous law required EPA to give appropriate consideration “to the necessity for the production of an adequate, wholesome, and economical food supply” when setting tolerances to protect the public health. EPA has traditionally assessed both the risks and benefits of a pesticide’s use as part of the tolerance-setting process. For certain pesticides that appeared to present significant risks, EPA carefully weighed the risks against the benefits to evaluate tolerances. A benefits evaluation provides information on the way a pesticide is used, the economic and consumer impacts of discontinuing a use and on the availability and practicality of alternative pesticides or treatment methods. Benefits assessments allowed EPA to determine whether a certain risk could be justified in light of the seri-

ous economic consequences or disruption to the food supply that would occur if a use were denied or discontinued because a tolerance could not be set. In practice, economic considerations have not driven tolerance decisions or been the basis for granting tolerances that allow unsafe pesticide residues in food.

In certain narrow circumstances, the 1996 Food Quality Protection Act (FQPA) allows tolerances to remain in effect that would not otherwise meet the new safety standard, based on the benefits afforded by the pesticide. Pesticide residues would only be “eligible” for such tolerances if use of the pesticide prevents even greater health risks to consumers or the lack of the pesticide would result in “a significant disruption in domestic production of an adequate, wholesome, and economical food supply.” Tolerances based on benefits considerations would be subject to a number of limitations on risk and more frequent reassessment than other tolerances. All tolerances would have to be consistent with special provisions for infants and children.

Therefore, this provision narrows the range of circumstances in which benefits may be considered and places limits on the maximum level of risk that could be justified by benefits considerations. It would also apply only to “non-threshold” risks posed by pesticides, e.g., carcinogenic effects for which conservative quantitative risk assessment is appropriate.

When use of a pesticide is banned, producers are forced to turn to alternatives that may be more expensive, less effective, or both. Higher costs are passed on to consumers to whatever degree the market will bear. Less effective pest and disease control can reduce both yields and quality. Both higher pest control costs and lower yields can lead to higher prices and/or lower supplies. This could lead to decreased consumption of the commodity if imports are not available to fill the gap. Even when overall effects are small, some producers may be placed at a competitive disadvantage. This can change the supply of certain varieties of fruits and vegetables or other foods. On the other hand, the absence of such regulations could undermine consumer confidence in foods and suppress demand.

Prior to the 1996 FQPA, all pesticide registration decisions by EPA considered the benefits of the pesticide in ensuring a plentiful food supply. EPA, and in some cases USDA, estimated the effects of each proposed pesticide decision on yields, producer income, and con-

sumer food costs. For example, the proposed cancellation of propargite was projected to reduce the quantities of peaches, nectarines, plums, prunes, and strawberries by between 2 and 2.7 percent, with much larger effects in some regions where the pesticide was more important to production (USDA, National Agricultural Pesticide Impact Assessment Program, 1994). Unfortunately, there are very few studies of effects after an agricultural chemical was actually canceled, although there is some anecdotal evidence. For example, while overall apple production was not greatly reduced by the voluntary withdrawal of Alar, a growth regulator, many growers in the mid-Atlantic can no longer grow particular varieties which depended on the growth regulator (Gianessi 1993).

In practice, EPA often grants registrations for an alternative in conjunction with cancellation of a pesticide in order to minimize losses (Gianessi, 1993). USDA can also target research funds to develop alternatives. However, the regulatory process can affect consumer choices even without a cancellation. Pesticide manufacturers sometimes withdraw their application for a pesticide registration in response to a requirement for additional data, and many potential pesticides are never introduced (Gianessi, 1993).

The 1996 FQPA resulted in some changes in the regulation of pesticide residues that could affect prices or availability of some foods. Some of the provisions could result in lower allowable levels of pesticide residues on foods, which could lead to higher costs because alternatives are more expensive, or lower yields because alternatives are less effective.⁷ Other provisions allow safe levels of residues on foods where no residues would have been permitted under previous law, which could lower crop protection costs or increase yields (EPA, 1996).⁸ The EPA is aware of these issues and is working with

⁷ The FQPA narrowed the range of circumstances that would allow the consideration of pesticide benefits in tolerance decisions. The FQPA also requires greater consideration of risks to children, essentially requiring an assumption of greater risk when information about safety to children is lacking. Further, the FQPA requires EPA to develop new tests for possible effects of pesticide residues on the endocrine system (EPA, 1996).

⁸ The FQPA replaced the Delaney Clause, a provision that in practice prohibited tolerances for some pesticides if the residue had the potential to concentrate in a processed product, and carried a cancer risk that was so low that it would have been allowable on other foods. The FQPA allows residues in processed foods as long as they are “safe,” defined as “a reasonable certainty that no harm will result from aggregate exposure” to the pesticide (EPA, 1996).

USDA, the agricultural community, and other parties to produce an implementation approach that meets the health standard of the Act while minimizing the harm to agriculture and maintaining availability of reasonably priced food.

In addition, the FQPA contains a potentially important provision that could influence information available to consumers about pesticide residues and thereby influence their food consumption choices. The new law requires EPA to publish a short pamphlet containing consumer-friendly information on the risks and benefits of pesticides. This information would be distributed each year to “large retail grocers for public display (in a manner determined by the grocer).” In addition, petitions for tolerances by pesticide manufacturers must include informative summaries that can be published and made publicly available. This information can either decrease consumer concerns (if it can show how low pesticide residue risks compare with other sources of risk) or increase them (by simply drawing attention to the risk because consumers often react to the fact that a risk is nonzero) (Magat and Viscusi, 1992).

Animal Drug Approval

FDA approves drugs for use in animals, including livestock, dairy, poultry, and aquaculture. In addition to treatment or prevention of disease, animal drugs can be used to affect rates of production variables such as growth, weight gain per unit of feed, or milk production in the case of dairy animals. These factors influence the costs of production, so the approval or restriction of a (production) drug can affect prices and availability and, therefore, consumption of meat, poultry, and dairy products. Further, animal production drugs can affect the composition of the final product—such as the fat content of meat—so approval of a drug can increase the availability of leaner meats in some cases. As with pesticides and additives, consumer perception about the safety of the drugs used can also affect consumer demand.

The case of bovine somatotropin illustrates the tradeoffs between supply gains from the use of animal production drugs and the potential for consumer distrust. Recombinant bovine somatotropin (rbST) is a synthetic hormone injected into dairy cows that increases milk output by 12-15 percent per cow (Martin and others, 1990). On November 5, 1993, FDA approved an rbST product after determin-

ing, among other things, that it was safe for treated animals and that the food products from the animals were safe for human consumption. FDA also found that there is no difference in hormone levels or nutritional composition of the milk produced by cows treated with rbST. Opponents have claimed that use of rbST could cause health problems in humans, stress on dairy cows, and increased pressure on small dairies (Ben & Jerry's Homemade, Inc., 1997; Mothers and Others, 1997). Douthitt and others (1996) found that 5 percent of surveyed consumers reported having reduced their consumption of milk after rbST was introduced, 0.3 percent reported having stopped buying milk altogether, and 8 percent reported buying only milk identified as from untreated cows. However, ERS researchers were unable to detect any effect of rbST introduction on demographic, price, and income coefficients in a model of monthly per capita milk consumption for 12 milk marketing orders from December 1978 through September 1996 (Aldrich and Blisard, 1998). While consumer distrust may not have materialized as predicted, consumers with strong concerns benefit from labels to identify characteristics of interest to the consumer, such as "from cows not treated with rbST." Regulations influencing labels are discussed in the next section.

Information Regulations

Information regulations aim to correct the market failure associated with information asymmetry (when sellers have more information about a product's characteristics than buyers, or vice-versa). Information asymmetry occurs frequently with food products because consumers are unable to verify certain food characteristics, such as its level of safety, its ingredients, or its nutritional composition. As a result, producers have insufficient incentive to produce the optimum level of these characteristics. Government regulations can reduce or eliminate the asymmetry by providing consumers with direct information about the relevant food characteristic, or by establishing standards of identity and quality grades that indirectly provide consumers with some assurance regarding the food characteristic in question.

Food Labels and Advertising

Food labeling regulations under FDA and FSIS stipulate what information is required on labels, as well as what information is permitted

and not permitted on labels. Similarly, advertising regulations under the Federal Trade Commission prohibit advertising that is untruthful or misleading. Nutrition information, nonhealth information—such as “dolphin-safe”—and safe handling labels are all controlled to varying degrees by regulations.

Nutrition labeling. Current regulations require that all food ingredients and specific nutrition information be listed on the label of most processed food products. Regulations introduced in 1993 also set clear standards for the use of nutrient content claims and health claims. For example, a “high fiber” food must contain at least 5 grams of fiber per serving and either meet the definition for a low-fat food (no more than 3 grams of fat per serving) or provide the level of total fat next to the high fiber claim (Stehlin, 1993).

The 1993 nutrition labeling regulations by FDA and USDA encourage providers of fresh produce, seafood, and meats to voluntarily provide nutrition information on the most commonly consumed raw foods (in the same format as nutrition information on labels of processed foods). Although providing nutrition information for raw foods is voluntary, it could become mandatory if less than 60 percent of grocery stores nationwide do so voluntarily.⁹

Although little research is available on the impact nutrition regulations might have on consumer food choices, the regulatory impact analyses for the 1993 nutrition labeling regulations estimated that (1) compliance costs would translate into small price effects with little, if any, impact on overall food consumption (DHHS, 1991; USDA, Food Safety and Inspection Service 1991a); (2) a small-business exemption would eliminate any likely effect on the variety of products available resulting from small-scale producers of specialty items being unable to comply profitably because of higher fixed costs (DHHS, 1993); and (3) the nutrition information itself would have a beneficial effect on consumer food choices (DHHS, 1991).

⁹ FDA is required by the NLEA to make labeling of the 20 most frequently eaten fruits and vegetables and raw fish mandatory if voluntary compliance is less than 60 percent of stores. FSIS is not required by law to make labeling of raw meat and poultry mandatory, but will initiate rulemaking to determine whether a mandatory program would be beneficial if less than 60 percent of stores provide nutrition information for 90 percent of the 45 major cuts of meat and poultry.

The latter expectation was based on results of a nutrition information program introduced by Giant Food, which used shelf-tags to identify products low in fat or sodium or high in fiber. In the test stores, the market share for products that were low or reduced in fat, cholesterol, sodium, and/or calories increased more rapidly (or declined less rapidly) than in the control stores where tags were not used (Levy and others, 1988). Based on these results, researchers predicted that the changes in food choices resulting from the new nutrition labels would translate into reductions in consumption of fat, saturated fat, and cholesterol of 1.4 percent, 0.7 percent, and 0.1 percent for women, and 1.4 percent, 1.3 percent, and 0.1 percent for men (DHHS, 1991). Furthermore, these changes were believed to underestimate the true changes, since the presence of nutrition information on the labels would encourage food manufacturers to improve the nutritional profile of their products (see chapter 11).

Data on new food product introductions show that interest in reduced- or low-fat foods increased after the new nutrition labeling regulations took effect. In 1996, 15.6 percent of all new food products made a fat-related claim, up from 3.4 percent in 1988 and 9.6 percent in 1994 (Friedman, 1995). Introductions of low-fat versions were most common for peanut butter, crackers, cheese, and tortilla/corn chips (*Food Labeling and Nutrition News*, 1997b). Nutritionally improved foods were found to command a price premium (Frazão and Allshouse, 1996).

The initial interest may be waning, however, as the novelty effect subsides. Fat-related claims fell to 11 percent of new food products in 1997 (Dornblazer, 1998), and sales of some of these products have begun to flatten or even decline (*Food Labeling and Nutrition News*, 1997a). The percent of surveyed consumers who reported changing purchases because of nutrition label information fell from 70 percent in 1996 to 61 percent in 1997 (Food Marketing Institute, 1997).

Survey results suggest that the new nutrition regulations may have had some effect on individual food choices, although the expected reduction in overall fat intake is elusive. Intake of fat as a share of calories dropped from 34 percent in 1989-91 to 33 percent in 1994-96 (USDA, ARS, 1998). However, average total fat intake has increased from 71.8 grams per day during 1989-91 (Tippet and others, 1995) to 74.4 grams per day in 1994-96 (USDA, ARS, 1997). (Calorie intake increased from 1839 per day in 1989-91 to 2002 per day in 1994-96.) Individuals who consume low-fat foods may com-

pensate with higher intakes of fat and/or calories in subsequent meals (Shide and Rolls, 1995; Foltin and others, 1992).

Non-health information. Other information on labels can also influence food choices. Food label regulations permit foods to be identified as “organic,” “natural,” “not irradiated,” “kosher,” “dolphin-safe,” or “made in Texas,” as long as such claims are truthful and not misleading. This allows the development of niche markets in which consumers can identify products with a characteristic of interest to them. Some consumers might otherwise avoid foods not labeled to proclaim such an attribute. In cases where consumer avoidance is based on fear of health effects, however, permission to label could be misleading if it creates the impression that another product is unsafe.

Milk produced from cows treated with rbST is an example of these labeling issues. To allow consumers to be informed while preventing deception, FDA issued interim guidance on voluntary labeling of milk and milk products from cows not treated with rbST (DHHS, 1994). FDA recommended that labels identifying products as “from cows not treated with rbST” also include a statement, “No significant difference has been shown between milk derived from rbST-treated and non-rbST-treated cows.” FDA also recommended that firms using “from cows not treated with rbST” labels should have a record-keeping system to verify the label’s claim since it is not possible to distinguish milk from treated vs. nontreated cows by current laboratory methods.

Safe handling labels. Safe handling labels are required on fresh meat and poultry products. These labels instruct consumers to refrigerate the product, cook it thoroughly, and avoid cross-contamination of other surfaces that could contact food. Industry concern that these labels might frighten consumers into avoiding fresh meat and poultry products has not been borne out. The labels have instead contributed to some improvement in handling practices, with nearly 60 percent of consumers reporting they have seen the label and, of those, over 40 percent reporting they have changed their practices as a result (Food Marketing Institute, 1996).

Standards of Identity

Standards of identity require food products to be what they claim to be, that is, peanut butter must be made from and contain a minimum

amount of peanuts. Standards of identity cover hundreds of foods, including milk, specific cheese types, processed meat products, juices, and baked goods. The minimum and maximum compositional requirements prevent economic deception by protecting against the addition of water or other fillers that could dilute the value of the nutrients in the food. The standards enable consumers to try new brands with some assurance about the nature of the product. Without this assurance, manufacturers would be vulnerable to unfair competition from inferior products and consumers would lose confidence in the food supply (DHHS, 1995b).

With rising consumer concern about nutrition, however, standards of identity have been criticized for restricting access to more healthful alternatives (Public Voice, 1991; National Research Council, 1988). Because many standards include minimum requirements for fat content or other fat-containing ingredients, lower fat versions that did not meet the food's standard were required to carry labels identifying them as "alternative," "replacement," or "substitute"—which were seen as pejorative—or had to be given a different product name. For example, under standards adopted in 1938, a product labeled "ice cream" had to have a minimum of 10 percent milkfat (8 percent if the ice cream included bulky flavors) or it was deemed to be misbranded or adulterated. Frozen dairy products containing only 5 percent milkfat were called ice milk. Standards for frankfurters, bologna, and sausages, on the other hand, limit the amount of fat and added water, but also restrict the addition of binding and emulsifying ingredients that could substitute for fat, such as starch vegetable flour and lecithin.

Manufacturers argued that lower fat versions were not nutritionally inferior, and that such products should be identified with an appropriate descriptor of nutrient content and a commonly understood name (USDA, FSIS, 1995). FDA and FSIS recognized that the 1993 nutrition labeling regulations—which require a more complete list of ingredients and nutrition information—provided much of the protection that the standards of identity were intended to provide, and ensured that consumers would have vastly more information about the makeup of a particular food product than was available when the standards were first adopted in 1938.

Therefore, FSIS and FDA have begun revising standards of identity, both in response to requests by manufacturers and consumer groups,

and more broadly as part of efforts to reduce unnecessary regulation (HHS, 1995b; USDA, FSIS, 1995). For example, FSIS has proposed a rule that would allow low-fat processed meat and poultry products to use the standard terms instead of requiring them to be identified as “imitation” meat (USDA, FSIS, 1995).¹⁰ The proposed label for low-fat processed meat and poultry product requires additional ingredients to be listed on the ingredient statement—such as water and fat-replacing ingredients—with a designation that these ingredients are either in excess of amounts permitted in the standard product or are not in the standard product. Labels would also have to inform consumers of any differences in functional properties resulting from the reformulation. For example, if the lower fat version of frankfurters does not hold up under freezing, the label would need to state “do not freeze.” If the low-fat version of cream cheese does not perform well in baked recipes, the label should state, “not recommended for baking” (USDA, FSIS, 1995). Thus, the label can inform the consumer of deviations from the standard product while still conveying that the product will be similar in flavor and texture to the standard product.

Similarly, in response to manufacturers’ and consumer groups’ requests, FDA removed the standard of identity for ice milk in 1994 (DHHS, 1995b). Products formerly labeled as ice milk may now be labeled as “reduced-fat ice cream” or “low-fat ice cream” depending on the total fat content of the food. Manufacturers may also make other versions of ice cream, such as “nonfat ice cream” or “light ice cream.” These changes increase the variety of products available, while safeguarding the integrity of traditional standardized products. Consumers are informed by the product labeling of the differences between the traditional standardized product and the modified version (DHHS, 1995b).

On the other hand, earlier standards of identity for certain lower fat milk, sour cream, and yogurt products were inconsistent with current definitions for lower fat products. To eliminate this inconsistency, FDA revoked the standards of identity for these products in 1996. In order to be labeled “low fat,” “reduced fat,” or “light/lite,” these

¹⁰ A Policy Memo provided guidance on this issue as early as 1991, but at that time the label for low-fat hamburger would have been required to identify the food as “low-fat hamburger, water, and carrageenan product” (USDA, FSIS, 1991b). A 1995 Policy Memo permitted a less pejorative label such as “low-fat pepperoni” (USDA, FSIS, 1995).

products must now use the same definitions used by all other food products (DHHS, 1996a).

Quality Grades

The Commodity Standardization Program of the USDA Agricultural Marketing Service (AMS) establishes quality grades for many fresh food commodities, including eggs, milk, fruits, vegetables, meat, poultry, and grains, as well as bulk processed commodities such as frozen vegetables. Commodity graders are Federal employees or federally licensed State inspectors, but the grading services are voluntary and paid for by the firms requesting it. These grades aid in the marketing of agricultural commodities by providing (1) a common language of trade and (2) a means of measuring value to establish prices (GAO, 1990). The grade conveys information about the size, shape, maturity, and blemishes of the commodity so the buyer can compare prices for commodities of similar quality. In other cases, such as grains, the grade conveys information on characteristics that are not observable by visual inspection, such as the protein content and moisture of the grain. This more efficient transmission of information about the commodity helps reduce the cost of marketing the commodity. Lower marketing costs can either lower prices for producers or increase profits for producers or suppliers, which can increase the probability that a particular item will be available for sale.

When grades do not reflect consumer preferences, producers may not have an incentive to supply the desired characteristics because consumers cannot convey that they would be willing to pay a premium for the attribute. Consumers may consume less of a food if there is a risk that the quality is below their expectation. For example, a survey found that inconsistencies in flavor, tenderness, and juiciness—factors cited by consumers in Virginia to explain why they have decreased their purchases of beef—could explain part of the decline in market share of beef throughout the 1980's (Purcell, 1993).

Grade names also have the potential to appeal to consumers. The “Good” beef grade, which applied to leaner beef, reflected historical preferences for higher fat content; beef with higher fat marbling is graded as “Choice” or, for even higher fat, “Prime.” Preferences began to shift to lower fat content, but the “Good” grade name may have had the connotation of a mediocre product (Sims, 1998). To appeal to consumers interested in lower fat content, the grade name

for leaner beef was changed from “Good” to “Select” in 1987. The change may have had a significant impact on consumption of that grade: the proportion of beef graded good increased from 1.8 percent in 1986 to 9.3 percent in 1989 (Sims, 1998). The “Select” grade was further restricted to younger animals in 1997, which could further increase consumer interest in leaner beef, since younger beef is generally more tender for a given fat content.

Regulations Covering Other Sectors

Food choices can also be affected by regulations such as environmental control, worker safety, protection of competition, and trade policies that, while not aimed specifically at the food sector, influence food production or marketing.

Environmental Controls

Water and air quality standards at the Federal and State level are intended to minimize the contamination of streams and ground water from livestock, dairy, and poultry wastes, as well as air quality problems associated with ammonia, methane, and odors (Christensen and Krause, 1993). Some farm operations may also be controlled by regulations to address other problems, such as dust, insects, rodents, noise, and degradation of aesthetics. Such controls generally impose added costs on producers and eventually are passed on to consumers (Christensen and Krauss, 1993). Higher prices could lead to a reduction in consumption.

In general, there has been little research on the effects of environmental regulation on food choices, but the impending ban on methyl bromide has been studied in some detail because its effects on some crops could be severe. The Clean Air Act (as revised in 1998) includes a phaseout of the fumigant methyl bromide—cutting use by 25 percent in 1999, 50 percent in 2001, 70 percent in 2003, and 100 percent in 2005—because it reduces ozone in the atmosphere. Quarantine and shipping uses are exempt and critical agricultural uses will be exempt after 2005. Because alternatives to methyl bromide are very limited, this cancellation could cause large yield losses for Florida and California strawberries and Florida tomatoes if these crops do not qualify as critical uses. Imports may only partly substitute for lost domestic production, especially in the short run, and

overall consumption of strawberries and tomatoes may decline at least temporarily (USDA, National Agricultural Pesticide Impact Assessment Program, 1993).

Worker Safety

Agricultural producers are also subject to worker safety restrictions, which influence the cost of production and thus influence food prices and food choices. Producers are subject to safe labor requirements enforced by the Occupational Safety and Health Administration of the U.S. Department of Labor. In practice, employers of 10 or fewer employees have often been exempted by annual congressional action (Runyan, 1992). In addition, agricultural employees are protected from pesticide hazards by the Federal Insecticide, Fungicide, and Rodenticide Act, enforced by EPA. Applicators of restricted use pesticides are required to be certified through training, competency exams, and State licensing. EPA pesticide protection standards for other pesticide handlers (e.g., workers involved in mixing pesticides) as well as harvesters and other farm workers were revised in 1992 (EPA, 1992). The new standards require training, protective equipment in some cases, more specific field re-entry restrictions, notification of pesticide applications, supplies for washing spilled pesticides (such as water, soap, and paper towels), and emergency assistance. These changes were projected to cost \$94.3 million across all farms in the first year and \$49.4 million in subsequent years (1992 dollars). While these amounts are small relative to the total value of agricultural production (\$226 billion for all commodities in 1996; see USDA, ERS, 1997a), some crops or varieties could be disproportionately affected by the employee training requirements because they involve more employee turnover or require more frequent pesticide applications (EPA, 1992).

Protection of Competition

Mergers and anticompetitive behavior in the food industry are regulated by the U.S. Department of Justice; the Federal Trade Commission; the Commodity Futures Trading Commission; and USDA's Grain Inspection, Packers, and Stockyards Administration to prevent the development and exercise of monopoly/monopsony power.

Industry concentration could result in monopoly power, with consumers facing a small group of sellers, or in monopsony power, with input suppliers facing a small number of intermediate buyers. Firms with monopoly power raise consumer prices above competitive levels and sell their products in quantities below the competitive level. Longstanding market power could shield firms from competitive pressures, eroding processing productivity and raising costs. But increased consolidation may also result in greater efficiency, which could lower prices to consumers. Thus regulation of competition may have complex effects, which regulators attempt to take into account.

Trade Policy

Trade policies that restrict food imports, such as the sugar import quota under the sugar program, can result in lower consumption of foods at higher prices. Trade policies that encourage exports—such as the Food for Peace Program, which provides for concessional sales, donations, and grants—can also result in lower domestic availability, although for commodities that are produced in surplus (such as wheat and feed grains), this may have little impact on food choices.

Under several multilateral and bilateral trade agreements, countries have agreed to relax trade restrictions. Under the North American Free Trade Agreement (NAFTA), the United States eliminated tariffs on imports of several commodities in 1994, with additional tariff removals scheduled for later years. While many factors, such as weather and exchange rates, influence fluctuations in imports and exports, ERS (1997b) has estimated that, in 1996, agricultural imports from Mexico and Canada were about 3 percent and 5 percent higher, and agricultural exports to Mexico and Canada were about 3 percent and 7 percent higher, than they would have been without the agreement. Imports of several fruits and vegetables were higher in 1996 than they would have been without NAFTA, including fresh tomatoes (6-15 percent higher), frozen broccoli and cauliflower (6-15 percent higher), and orange juice (2-5 percent higher). The agreement also fostered increases in two-way trade; for example, U.S. beef exports to Canada were about 100 percent higher in 1996 because of NAFTA, while U.S. imports of beef from Canada were about 50 percent higher.

NAFTA and the Uruguay Round Agreements of the General Agreement on Tariffs and Trade (GATT) require any sanitary and

Table 1—Selected regulations/policies affecting dietary choices

Program/reg	Foods affected	Effects on dietary choices	Size of effects
Farm assistance programs (current and historical)			
Price and income support programs	Wheat, rice, feed grains, oilseeds, dairy, peanuts, sugar	Surplus purchases reduce marketed supply, increase price. modities, feed crops Import restrictions reduce domestic supply, increase price. Acreage restrictions reduce supply, increase price. Deficiency payments may increase supply, but payments usually linked to acreage restrictions. Milk marketing orders set regional minimum prices for milk for different uses; may lead to below-market prices for cheese.	Small—low price elasticity of demand for affected com only part of meat, poultry, dairy, egg prices. Can be large for a pop. group when surpluses are distributed to that group. Small—due to low price elasticity of demand
Fruit/vegetable marketing orders	Federal orders: 27 fruits/vegs., and spec. crops. Others covered in State orders.	Some marketing orders set quality limits, which may limit availability, but also increase demand by reducing quality variability.	No estimates available.
Research and promotion	Federal programs: beef, dairy, eggs, honey, mushrooms, popcorn, pork, potatoes, soybeans, water-melons, wheat. State programs for many fruits and vegetables.	Producer assessments fund generic advertising; can increase consumer demand for the commodity.	Dairy—see Chpt. 10 Beef: mixed evidence. Catfish: large. Orange juice: limited
Food safety			
Food inspection	All foods	Safety requirements may increase costs, and price of foods. Confidence in the food supply may increase demand.	Small impact on costs, except for small firms. Effect of lower consumer confidence large in short run.

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Table 1—Selected regulations/policies affecting dietary choices, cont.

Program/reg.	Foods affected	Effects on dietary choices	Size of effects
Food additive approval	All processed foods	Can increase shelflife, lowering costs; can provide characteristics of interest to consumers, increasing demand.	No estimates available, but demand effects could be large for some additives leading to low-fat or fat-free foods.
		Approval process expensive, restricting development to high-profit foods, but maintains consumer confidence	No estimates available.
Pesticide regulations	All foods	Restrictions may decrease supply, increase price	Overall impacts small, may be large for certain varieties.
		Confidence in the food supply may increase demand.	Effects of lower consumer confidence large in short run.
Animal drug approval	Meat, poultry, eggs, dairy, farm-raised seafood	Approvals allow use of drugs, which increase supply, decrease costs of production.	Small—low farm-price-to-retail-price ratio, low price elasticity of demand.
		If consumers don't accept new drug, could decrease demand.	Effects of consumer concerns usually temporary.
Information regulations			
Labels/advertising	All processed foods (fresh food labels voluntary, but any labels standard format)	Information affects demand for foods.	Small effect of information.
		Information affects formulation decisions.	Effect of formulation changes may be larger (see chpt. 11)
		Label regs. increase costs, price of foods.	Small effect on price except for small firms.
Standards of identity	Over 200 processed foods	Prior to revisions, lower fat versions required to be labeled as “imitation” or other pejorative term, which suppressed demand for more healthful products.	Revisions may have had a large effect for some items (low-fat ice cream/hot dogs).

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Table 1—Selected regulations/policies affecting dietary choices, cont.

Program/reg.	Foods affected	Effects on dietary choices	Size of effects
Quality grades	Dairy, eggs, poultry, beef, many fruits and vegetables	Standardization lowers information costs for marketing. Where grades used at retail level (such as for beef), grade name can affect consumer demand.	No estimates available.
Other regulations			
Environmental controls	Potentially all foods	Environ. controls could increase costs (or prevent cost-decreasing changes).	Could be large for individual fruits/vegetables with high price elasticity of demand.
Worker safety	All foods	Protection of farmworkers and food storage and processing personnel could increase costs.	Small for farmworkers; other estimates not available.
Protection of competition	All foods	Restrictions of mergers prevent monopoly power, which could decrease supply and increase prices. Increased consolidation may also result in greater efficiency, which could lower prices.	No estimates available.
Trade policy	All traded foods	Policies that restrict imports or encourage exports decrease domestic supply and increase price.	Small for dairy and sugar with low price elasticity of demand. Larger for fruits and vegetables with
		higher price elasticity of demand.	

phytosanitary restrictions on imports, either for food safety or for crop protection, to be based on fair science-based rules. In February 1997, USDA's Animal and Plant Health Inspection Service (APHIS) partially lifted a 1914 ban on Mexican avocados set to protect U.S. avocado production from Mexican avocado pests that might be accidentally imported with the fruit. To minimize the risks of imported pests, Mexican avocados are allowed only into 19 Northeastern States and the District of Columbia, which do not produce avocados. APHIS projected that, as a result, the price of avocados could fall by anywhere from 8 to 41 percent in these States, with consumption increasing 8.6 to 44 percent (Roberts, 1997). This case illustrates the potentially large magnitude of effects on individual foods from changes in trade policy.

Conclusions

Regulations—whether or not they are directed specifically at the food sector—can affect the varieties and qualities of foods available for purchase, the prices consumers face, the information consumers receive about a product, and consumer confidence in the food supply. The examples described here illustrate that the impact of regulations that affect the supply of commodities depends on how the regulations affect retail food prices and how responsive consumers are to those prices. Ingredient costs are a small fraction of retail prices for many processed foods, but commodity prices are a larger fraction of retail prices for fresh meat, fish, poultry, eggs, milk, cheese, and produce. Consumers are not very responsive to prices for poultry, eggs, fish, milk, and cheese, but are more responsive to the prices of some fresh fruits and vegetables, as well as beef and pork. From the standpoint of dietary guidelines, policies that may affect the consumption of individual fruits and vegetables considerably may not affect overall consumption of fruits and vegetables by very much. Yet even when overall impacts of regulations are small, the impacts on different agricultural regions, or firms of different sizes, can be large. And even when impacts on the diet of the population as a whole are small, the impact on specific population groups can be significant, as in the case of food surplus distribution programs.

Regulations that affect the information that consumers receive have the potential to at least temporarily influence individual food choices, either the direct effect of the information on consumers or from prod-

uct reformulation by food manufacturers. Yet individual food choices, such as consumption of lower fat foods, are not necessarily associated with lower fat intake overall. Even generic advertising for commodities, which shows strong effects in some cases, may increase consumption of one commodity at the expense of another in the same group.

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