Part III · Reassessing Policies to Facilitate Orderly Marketing

Throughout the twentieth century, the United States has had sophisticated policies for supporting and facilitating the efficient marketing of agricultural commodities. Quality grades for commodities, standards of identy for manufactured food products, planting intention surveys, crop forcasts, farrowing reports, market news, quarrentine arrangements for disease prevention, bonding of farm commodity buyers, meat inspection, trade practice regulation for brokers and commission firms, etc. are examples of policies to facilitate orderly marketing of commodities. In many cases, the organization for operating these policies was designed many decades ago. With changes in the industry served – changes in the general level of transportation, communication and other marketing services, and changes in marketing firms as well – the need for these services and the type of services needed changes.

The purpose of this section of our work is to develop a general rationale for these policies and programs and to make an assessment concerning areas which need more development and areas needing de-emphasis or updating. It is also hoped this work will be useful to the planning committee who will prepare for the next conference – specifically focused on updating this area of policy.

Implications of Structural Change and Emerging Technology for Public Policy Based on Orderly Marketing Concepts

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Structural change in agriculture has been significant over the past several decades. In addition, substantial technologically-induced change over the next decade and continuing evolution in consumer food demand and lifestyles is anticipated. Some commodity and food marketing federal policy is based, in whole or in part, on the concept of "orderly marketing."

The concept of orderly marketing surely accommodates some historic reality of the U.S. food production and marketing system. However, given recent and anticipated evolutionary changes in structure and technology influencing the system, the concept of orderly marketing as a relevant base for federal marketing programs becomes an issue worthy of examination.

This paper examines those policies based on orderly marketing in order to evaluate the current and future relevancy of orderly marketing as a base for agricultural marketing policies. In essence, the issue examined is whether structural and anticipated technologically-induced changes have rendered the orderly marketing concept outmoded. A closely associated issue is the adequacy of existing federal government infrastructure to meet the future environment within the U.S. food production and marketing system.

Clearly, the effective, efficient implementation of policy is partly a function of federal government infrastructure. Structural changes and technological innovation may combine to diminish historic purposes and boundaries among agencies and induce changes in their optimal roles over time.

To accomplish this assessment, some characteristics of commodities, sold in markets in which orderly marketing has served historically as a base for federal agricultural marketing policies, are examined and the concept of orderly marketing is defined.

The next portions of the paper provide a taxonomy of all federal government policies in agricultural marketing and then identify those policies based on orderly marketing concepts. Some economic issues surrounding orderly marketing are then explored.

The next sections delineate some rather well-known evolutionary structural changes in food and commodity markets

and provide a sense of emerging technologies, especially biotechnology.

Finally, prognostication concerning the future regulatory roles of government agencies is offered along with concluding observations and implications.

Orderly Marketing Concepts

Commodity Characteristics

Before defining orderly marketing, it is useful to focus initially on commodity characteristics in those cases in which orderly marketing has been of concern historically. The commodity characteristics include perishability and seasonality in production and/or consumption.[2] These characteristics clearly would apply primarily to fruits and vegetables for fresh market, milk, some meat animal production and some specialty crops (mostly floricultural and horticultural). Substantial price swings within a production season can result for commodities with these characteristics. This effect is attributable, at least partially, to the biologic nature of agricultural production in which adjustments in aggregate within-season supply (private or public inventory adjustments) are not possible for commodities with these characteristics. In some instances, the biologic nature of production involves longer periods spanning several years, as is the case with perennial tree crops, which would encourage wide price swings across seasons (Armbruster and Jesse, p. 123).

Definition of Orderly Marketing

The definition of orderly marketing is rudimentary to the analysis here. The agricultural marketing literature is replete with references to the phrase, "orderly marketing," and although several standard agricultural marketing texts use the phrase, none offer a cogent definition. Babb, et al., while not defining orderly marketing, do define "disorderly marketing" as "the lack of coordination between buyer and seller at any stage of the vertical marketing system . . . which reduce[s] the operational efficiency, equity, or innovativeness of the marketing system" (p. 172). While this conceptualization closely parallels the definition offered in this manuscript, it apparently is more inclusive than the conceptualization imbedded in legislation. For example, the suggestion that orderly marketing encompasses the performance norm of "innovativeness" within the marketing system is not found in the principal legal foundations for orderly marketing.

In general, the concepts imbedded within orderly marketing are founded on notions of supply levels and price level and variability over time and space. The term, "orderly marketing," has something to do with "an orderly flow of the supply to market throughout the normal marketing season to avoid unreasonable fluctuations in supplies and prices" (7 U.S.C. § 602(4) (1970)). The legislative base for the concepts of orderly marketing began in the Depression era and have their roots in the Agricultural Adjustment Act of 1933 (AAA) Pub. L. No. 73-10. 48 Stat. 31, amended in 1935, Pub. L. No. 74-320, 49 Stat. 750 and the Agricultural Marketing Agreements Act of 1937, Pub. L. No. 75-137, 50 Stat. 246 (codified at 7 U.S.C. §§ 601-624 (1970)). Concern that the 1935 amendments to the 1933 Act would not survive judicial review led to the 1937 Act (Babb, et al., p. 163). The contribution of the 1937 Act was the explicit incorporation of supply and demand conditions into the price determination process.

A review of a number of sources provides the base for identifying the concepts fundamental to defining orderly marketing:

- Assure adequate supply.
- Dampen price variability to both producers and consumers.
- Countervail power at the producer-first handler level.
- Assure "accurate" price differentials over space and quality.

These concepts indicate concern for the economic well-being of both producers and consumers and are discussed in the context of agricultural commodity marketing. Where appropriate, their legislative base is identified.[3]

Assurance of adequate supply obviously relates to having a continual supply of a perishable commodity. The Agricultural Marketing Agreement Act of 1937 uses the simple phrase, "insure a sufficient quantity" (7 U.S.C. § 601(18) (1937)). The context of the legislative references to adequate supply indicates concern that, at certain times, consumers might not have quantities of a seasonally-produced perishable commodity to purchase *at any price*.

Dampening price variability indicates a legislative concern for widely fluctuating prices during a production season and implies that both producers and consumers will benefit from dampened within-season price variability. The Agricultural Marketing Act of 1929 uses the phrase, "undue or excessive fluctuations or depressions in prices for the commodity" (7 U.S.C. § 1(4) (1929)). The context of this legislation infers that price stability within domestic and foreign commodity markets is part of "orderly marketing."

Legislation addressing countervailing power at the producer/first-handler level is well-known. Recognition of the lack of market power for farmers was acknowledged in the Clayton Act (15 U.S.C. § 12 (1970)) and ultimately lead to passage of the Capper-Volstead Act (7 U.S.C. § 291 (1970)). Without Capper-Volstead, affiliation of farmers in joint marketing organizations such as milk cooperatives could have been held to be an illegal contract or combination in restraint of trade in violation of either the Sherman Act (15 U.S.C. 2 §§ 1-27 (1970)) or several state statutes. Antitrust legislation recognizes that farmers can face monopsony power by first handlers and implicitly recognizes that this may be especially acute in the case of perishable products. Countervailing power as a concept complementary with orderly marketing comes primarily from the Agricultural Marketing Act of 1929 which uses language such as "encouraging the organization of producers" and "promoting the establishment and financing of a farm marketing system of producer-owned and producer controlled cooperative associations" (7 U.S.C. § 1(3) (1929)) as a means of achieving orderly marketing.

The notion of "accurate" price differentials as part of orderly marketing is perhaps the most elusive and novel of the four concepts enumerated above. Well-known results of perfectly competitive markets reveal that price differences over space will reflect only transportation costs and within a geographic market area prices will be identical for the same quality to all buyers and all sellers. A corollary to this is that price differentials among qualities

within a market will be sufficient to provide "accurate" signals to sellers concerning the relative value of various qualities.

Evidence for the price differentials notion as part of orderly marketing comes primarily from a General Accounting Office (GAO) report on federal marketing orders. In reviewing the economic factors leading to marketing orders, the GAO indicates that the federal milk marketing order program was established, at least partially, to assure that first handlers all pay the same price for the same quality milk within a market (General Accounting Office, p. 34). The implicit definition of orderly marketing within the report suggests that both producers and buyers within a given market area should realize identical prices for the same quality.

Federal Policies

As a precursor to identification of those federal policies based on the concepts of orderly marketing, a rather broad taxonomy is employed which allows edification of all federal policies influencing marketing. Once this is accomplished, the focus can turn to identification of only those federal policies based on orderly marketing concepts.

The categorization of all federal policies in agricultural marketing may be viewed as composed of three broad groups:

- competition policies,
- demand expansion policies, and
- group action policies.

The categories provide a focus for a number of otherwise seemingly disparate specialized policies. Space limitations prevent this review from including all federal marketing legislation. Rather, it is intended to lend some perspective useful in determining which policy categories are based on orderly marketing.

Competition Policies

The largest and perhaps the most significant of the three broad categories of federal agricultural marketing policies is, in various ways, intended ultimately to promote competition by influencing the balance of economic power at the producer/first-handler level. Competition policies are defined here to include the following policy subcategories:

- antitrust,
- trade practice regulation, and
- public price reporting and market information.

The set of antitrust policies that bear directly on economic power at the producer/first-handler level begins with the Sherman Antitrust Act of 1890 and continues through the 1970's with additional interpretations of Capper-Volstead from a rather complex set of case law (Levi and Sporleder; Farmer Cooperative Service). As previously mentioned, the Capper-Volstead Act is the cornerstone of modern antitrust policy regarding producer/first-handler economic power. The economic logic of Capper-Volstead, in an antitrust sense, is that it allows producers to form organizations with countervailing power because bilateral oligopoly is more desirable from society's standpoint than oligopsony.

Two other significant sets of policies aimed at the balance of economic power influence the nature of trade practices and public market information legislation. The

set of trade practice policies include, but are not limited to, unfair trade regulation, prompt- and full-pay provisions, truth-in-trading requirements, and discriminatory practice regulation (Knutson, Geyer and Helmuth, p. 240). Legislation includes the Packers and Stockyards Act, the Commodities Futures Trading Commission Act, the Perishable Agricultural Commodities Act, the Agricultural Fair Practices Act and the United States Warehouse Act, among others.

From an economic standpoint, both market information and trade practice regulation are policies intended, among other things, to redress information asymmetry stemming from oligopsonistic or spatially-monopsonistic structures at the producer/first-handler level. The notion is that collection of unbiased, statistically-accurate market information promotes competition in the long run. In general, public price reporting is justified on grounds of promoting competition, efficiency and fairness as well as providing the federal government with information it needs for monitoring and regulatory purposes (Henderson, Schrader and Rhodes, p. 22).

The subcategory of market information is interpreted broadly here and means any policies that improve market information to either producers or consumers. Accordingly, policies such as food labeling regulations and grades and standards facilitate efficiency and pricing accuracy and encourage competition throughout the food production and marketing system.

Demand Expansion Policies

A second subcategory involves federal policies intended to expand demand for agricultural commodities. The policies may have some humanitarian intent but also are aimed at either foreign or domestic demand expansion. The foreign demand expansion policies include the Export Enhancement Program (EEP), P.L. 480, and The Foreign Agriculture Service's Cooperator Program. These policies or programs are focused chiefly on selling more U.S. bulk commodities in world markets. The primary domestic programs include various food donation and dispersal programs, such as the Women, Infants, and Children (WIC) Program, school lunch program and food dispersal through commissaries.

Another subcategory of policy under this general heading is enabling legislation authorizing operation of producer self-help demand expansion programs through commodity check-offs. Check-off monies may be used for research and advertising and such expenditures normally are oriented to demand expansion for a particular commodity.

Group Action Policies

A third category includes enabling legislation to establish marketing orders and the encouragement of producers to form cooperative associations for purposes of joint marketing. These policies are not mutually exclusive with the competition policy category and, in terms of economic intent, are similar to competition policies. The distinguishing feature is that both subcategories of legislation enable group action by producers. As previously discussed, the principal legislative foundation is the Capper-Volstead Act and the Agricultural Marketing Acts of 1933 and 1937.

Orderly Marketing Foundation

Federal policies based, in whole or in part, on orderly marketing concepts as enumerated above include the broader categories of competition and group action policies. Specifically, the policies identified include antitrust polices, market information policies and programs, producer cooperatives and marketing orders. For this analysis, it is presumed that any one of the four concepts of orderly marketing are sufficient to conclude that the policy area is based on orderly marketing.

Clearly, the set of antitrust laws, including Capper-Volstead and significant case law interpretations of Capper-Volstead since its passage, provide abundant evidence that one intention of United States antitrust is to provide farmers with the ability to countervail economic power of either downstream buyers or upstream sellers. Imbalance of market power often is used as a justification for cooperatives (Harris, et al.). The ability of joint marketing and forming marketing-agencies-in-common provide powerful organizational avenues for farmers to inherently change the structure of a market from oligopsony to bilateral oligopoly.[4]

Market information policies and programs, especially those involving public price reporting, commodity market news and grades and standards, are based on orderly marketing. The obvious are dampening price variability, reducing information asymmetry at the producer/first-handler level to countervail power and assuring accurate price differentials over both space and commodity quality. One could argue also that some federal market information programs help assure adequate supplies.

The last two policy areas – cooperatives and marketing orders – are based fundamentally on orderly marketing concepts. As indicated, producer cooperatives provide a means for farmers to countervail economic power. In addition, depending on the cooperative's structure, it can dampen price variability to both producers and consumers. Marketing orders fundamentally are based on dampening price variability and assuring accurate price differentials.

Orderly Marketing Economic Issues

Although space limitations do not permit a complete exposition of all the economic issues of orderly marketing, several are worthy of review here. Of paramount importance is the issue of how high price must be at the farm gate to assure an adequate supply. It is sufficient here only to indicate that universally acceptable means of quantitatively estimating the minimum price necessary to achieve adequate supplies do not exist.[5] The controversy surrounding classified milk pricing is a case in point. Some argue that the goal of adequate milk supply could be met at lower prices than those resulting from classified pricing[6] (Masson and Eisenstat, p. 691).

Another issue concerns the welfare benefits from price stabilization. Orthodox analysis of price stabilization welfare benefits, based on rational expectations, concludes that price stabilization is socially beneficial compared to a free market because it will improve aggregate welfare (Massell). In addition, consumers are willing to pay a positive sum for more

stable food prices (Tweeten and Plaxico). However, the distribution of welfare gains between producers and consumers is highly sensitive to the source of stochastic variances and specification of the model. Also, production or consumption stabilization leads to differing benefits between producers and consumers compared to price stabilization (Subotnik and Houck, p. 15). On balance, commodity price stabilization is desirable but it is not necessarily true that producers always will benefit from it.

Another economic issue is understanding the economic motivations for using alternative exchange mechanisms at the producer/first-handler level. The importance of contracting and ownership integration is quite positively correlated with perishability and seasonality, those characteristics enumerated earlier that distinguish commodities for orderly marketing concern. Some relatively recent advances have been made in transaction cost theory and pertain to vertical relationships (Barry, Sonka and Lajili). Transaction cost logic may be used to understand firm motivations for choosing contracting or ownership integration, rather than open market transactions, when quasi-rent exploitation is possible (Sporleder).

Commodity perishability alters the vertical relationship among firms from sequential dependency to reciprocal dependency. Sequential vertical dependency among firms is characterized by buffer stocks that facilitate coordination (Galbraith). Reciprocal dependency is the vertical relationship in the presence of perishability and/or seasonality.

Without the opportunity of buffer stocks, dynamic mutual adjustments are necessary among firms in order to coordinate vertically. Dynamic mutual adjustments are arduous when first handlers procure input solely through open market or spot transactions. Contracting or ownership integration facilitate dynamic adjustments and, as a consequence, are the predominant vertical exchange mechanisms observed for perishable commodities.

In essence, more complex exchange arrangements are substituted for open market transactions to accommodate enhanced vertical coordination. Ownership integration particularly may be viewed as a substitution of rather enigmatic intrafirm organizational hierarchy for open market transactions. As transaction cost theory continues to advance, more sophisticated understanding of the motivations for firms' choice among various exchange arrangements may emerge.

Structural Change

Several long-term trends have been occurring in U.S. food and commodity markets. Total per capita food consumption is decreasing and food consumed is generally more processed, more packaged, more labeled and more convenient than in the past when food was prepared from scratch. Americans are eating more food away from home on a dollar-value basis, are purchasing more prepared foods to be eaten at home, are eating more ethnic foods and demanding more healthful foods (particularly low in cholesterol and sodium).

Changes occurring in food markets are consistent with changing demographic features. The U.S. rate of population growth is slowing and people are living longer. Hispanic, Asian and African populations

are increasing in the United States as a result of higher birth rates and/or increased immigration. Increasingly common are households consisting of only one person, married couples with no children, or a female head of household. By 1988, 57 percent of women were employed outside of the home; the majority work full time (Senauer, et al.).

U.S. food markets are consumer driven and food processors target products at consumer segments by lifestyle groups. The 1950's stereotypical homogeneous middle-class family consisting of a working father, a full-time homemaker mother and at least two children represents only 7 percent of U.S. households today. Specific consumer groups are being identified by firms and targeted along geographic lines by region or area; by demographic factors such as age, gender and income; and increasingly by lifestyle characteristics.

Major trends in consumer attitudes and behavior that will affect consumer patterns in the future include: a desire for higher quality products; greater variety and more convenience; products that are more healthful, safer and less damaging to the environment and society; and products that make a personal statement about individuality and ethics (Senauer, et al.). Products that embody ethical attributes increasingly will be desired by consumers. In particular, products that do not harm animals and that minimize any adverse economic effects on societal consumer segments will be elevated in value. Successful agribusiness firms will target markets to meet these diverse demands better than rival firms.

The sweeping changes in intermediary and final markets have triggered corresponding changes in market structure. The process is evolutionary and usually is termed "the industrialization of agriculture" (Godwin and Jones). The market's traditional way of matching demand and supply is diminishing as demand splinters into smaller niches. Targeting the growing number of products for niche markets takes more precision than the food market's traditional structure can offer. As a result, exchange mechanisms aimed at achieving vertical coordination, as alternatives to the open cash market, are becoming more common.

Traditionally, major undifferentiated farm products have been mass-marketed through an open production system in which agricultural production decisions are made prior to making marketing commitments. As a result, farmers and buyers are exposed to price, quantity and quality risks. All participants are potentially vulnerable. For example, farmers are vulnerable to unexpectedly large supplies of farm commodities, which can push prices down. Food processors, on the other hand, are vulnerable to unexpected shortages, which can push prices up, slow processing plants or force processors to substitute inferior quality inputs.

Open production relies on market prices to signal farmers exactly what consumers desire. And, orderly marketing concepts are based primarily on an open production system. For example, grading and pricing systems must be quite specific to differentiate among different types or quality grades important to food processors. Price signals can be inaccurate or misinterpreted as product specifications become more detailed. This system works well in marketing generic commodities that are sorted into a few broadly defined

quality grades. As markets become more specialized, however, the current system becomes more obsolete or complex (Barkema, et al.).

Two alternative exchange mechanisms for enhancing vertical coordination are contracting and ownership integration. With contract integration, firms establish legal commitments that bind producers to certain production or marketing practices. Firms bypass the open market and rely on formal agreements that control price, quantity and quality of goods delivered at a future time. Contracting provides a vehicle for firms to establish marketing commitments before or during the production process. These commitments reduce risks caused by variable price, quantity, or quality. Under ownership integration, single ownership interests extend to two or more levels of the production-marketing system. Ownership integration usually shifts control of farm production to the food processor or the raw commodity producer. Contracting provides tighter linkages between separate stages of the market than open production and ownership integration provides tighter linkages than contracting.

Data on the current structure of producer/first-handler exchange arrangements is limited but indicates an almost complete shift toward contracting and ownership integration in some industries such as broiler and vegetable processing. Cattle and hog contract production is increasing, but open production still predominates in the grain and oilseed markets. Greater vertical coordination via contracting and ownership integration will favor large farms, accelerating a long-standing trend toward fewer farms in the United States.

Farming will be substantially different than in the past. Farm production will change because of increased scale, greater use of complex technologies and more exacting product quality requirements.

Also, authority for many business decisions for some commodities produced likely will shift to food companies further downstream in the food chain. What seed to use, when it is planted and how it is harvested may all be decided by the firm that processes the crop or even the firm that offers it for retail sale.

Emerging Technologies

Successful agribusiness firms in the future will be those that identify products and services desired by consumers and provide those products in a timely manner more efficiently than rival firms. Production agriculture is on the verge of a new technological era. New biological and information technologies will enable firms to identify food markets and customize products to satisfy changing markets (Phillips and Walsh).

Agribusiness firms, for the most part, have adapted processing procedures to fit the constraints provided by the raw material. This situation will diminish in the future. New biotechnologies will enable the raw commodity to be altered to fit specific end-uses. Further, biotechnology will allow agricultural commodities to be used in new ways while modern information technologies will provide firms with the opportunity to take advantage of these new biological technologies effectively.

Biotechnology

Applications of biotechnology could affect every aspect of the agricultural industry. New products are being developed for on-farm use. For example, somatotropins and beta-agonists are being developed to increase feed efficiency of livestock and to decrease the fat content of carcasses significantly (Etherton; Veenhuizen and Anderson). Leaner meats, which are in demand by consumers, could be achieved by traditional breeding but take many years. These growth promotants can accomplish this feat more quickly. Crops are being developed that are resistant to insects and disease. Additionally, new biological pest controls are being developed. Such applications potentially can decrease synthetic pesticide use and therefore raise fewer food safety and environmental concerns among the public (Office of Technology Assessment).

The composition of agricultural commodities is being altered in ways that are appropriate for specific end uses. Scientists are attempting to alter the oil, starch and protein composition of many commodities. Oilseeds are being developed with higher percentages of polyunsaturated fatty acids. Tomatoes are being developed with higher solid content and with extended shelf-lives. Vegetables are being developed that are sweeter and crunchier and some will contain natural preservatives (Office of Technology Assessment).

Agriculture could become a source of high-value pharmaceuticals in the future. Transgenic animals are being developed to produce tissue plasminogen activator (TPA), used to dissolve blood clots after heart attacks; blood clotting factors; and human hemoglobin (possibly used to replace or supplement blood transfusions). Additionally, plants such as tobacco have been engineered to produce pharmaceutical products (Office of Technology Assessment).

Information Technology

New information technologies allow agricultural business firms to identify consumer demands shifting marketing efforts toward discovery of consumer preferences. New information technologies combined with new legal disclosure requirements improve the consumer's ability to identify product attributes. Consumers can make purchasing decisions based on product characteristics such as product quality, nutrition, food safety and environmental aspects in addition to factors such as variety, convenience and value.

In the past, technological constraints have inhibited agribusinesses' ability to identify markets and produce new products. Some new technologies will change this. New information technologies allow demographic data on consumer attitudes and values to be used to develop consumer lifestyle classifications. When this information is combined with data about consumer media preferences and purchasing behavior from customer records, survey data and supermarket scanner data, advanced consumer information systems can describe who and where customers are, what they want, what they buy and how they can be reached (Streeter, et al.).

Information technologies can be used to coordinate activities needed to respond to a consumer-oriented market and to provide products with particular attributes. Linkages are conditioned on market struc-

ture and as such, input and output prices have been relied upon as signals to coordinate activities. In the future, information technologies may facilitate new strategies by providing improved information flows, facilitating coordination of production and marketing (Office of Technology Assessment).

Impact of Emerging Technologies

Crop commodities generally fit into two categories: large-acreage volume crops, such as wheat, corn and soybeans; and smaller-acreage specialty crops such as tomatoes, potatoes and onions. There are several important distinctions between the categories.

First, biotechnology processes already are available to alter the harvestable component of some specialty crops such as tomatoes. This arises mostly because many specialty crops are easier to manipulate genetically than food and feed grain crops. Major developments for most food and feed grain crops generally are further away.

Second, there is less vertical coordination of input, production and marketing components for large-scale volume crops than for some small-acreage specialty crops. A major factor in this difference is specialty crop perishability. This means reciprocal vertical dependency among vertically-linked firms which provides an economic incentive for tight vertical coordination. Third, the potential market for new technologies is larger for large-acreage crops than the specialty crops. This is an influential driving force in terms of technological innovation.

Large-Acreage Volume Crops

Biotechnology applications such as herbicide resistant plants and biopesticides should be available in the near future (Office of Technology Assessment). Unlike previous mechanical technologies, most biotechnologies will not, in themselves, generate significant economies of size.

Also, there are few apparent incentives for firms supplying seed and chemical inputs to integrate into crop production. Biotechnologies that increase yield will have supply-increasing, price dampening effects in the long run. These will adversely affect the survival of high-cost producers, which for the most part are small- to moderate-size farm operations. Biotechnologies that enhance quality for specific end uses of corn or soybeans will find a ready market. In particular, demand is growing from processors for identity-preserved grains (i.e., grains produced in a specific geographic region, or a specific variety or by a specific method) that enhances the quality control of genetically-improved differentiated crops for specific end-use markets.

Small-Acreage Specialty Crops

Biotechnology already has the capability of modifying the harvestable product for some specialty crops. This capability increases the extent to which processes delineate product quality and also provides incentives for vertical coordination between inputs and the production stages for a number of specialty crops. Thus, even though no obvious economies of size are captured with biotechnology innovations, these innovations will encourage vertical coordination in some cases. Small-scale producers will be at a long-run competitive

disadvantage in specialty crop markets unless they have a particular market niche.

For fruits and vegetables, biotechnologies will be important in cases in which product quality, shelf-life and taste are important end-market characteristics. Technologies that allow for greater selectivity in specifying performance characteristics of different crop varieties will permit more rapid development of desirable cultivars and propagation of plant stocks. Markets for tomatoes, lettuce and carrots are large and relatively focused on a few specific varieties. Improvements in these crops have the potential for rapid, widespread adoption to the benefit of growers, plant stock breeders and consumers. Significant price premiums are expected for biotechnology-based improvements and consumers can expect to pay higher prices for more desirable products tailored to specific market segments.

Case Example – The Calgene Tomato. Calgene is a biotechnology-based seed, food and specialty chemical company that is developing proprietary plant varieties and plant products. Since the mid-1980's, Calgene has applied genetic engineering to tomatoes in an effort to significantly extend shelf-life and improve taste in fresh market varieties. The company has been successful in their field trials by producing a fresh market tomato with at least seven to ten days extended shelf life. Consumer benefits are that genetically engineered tomatoes may be harvested ripe for full flavor, shipped without refrigeration and delivered fresh to supermarket shelves without standard ethylene "gas" treatment. The company received the first U.S. patent covering the use of genetic engineering in tomatoes and is expected to commercially introduce their FLAVR SAVR tomatoes sometime in 1993.

Calgene expects to control the production and marketing of the tomatoes. Growers will be competitively selected to produce and harvest the tomatoes under highly-specified conditions. Calgene will control the distribution of the tomatoes and will merchandise them under their own label. Thus, FLAVR SAVR tomatoes will be available to consumers only through a vertically integrated company that controls the product from seed to retail sale.

Dynamic Regulatory Roles

The food and agriculture complex fundamentally is regulated by three major federal agencies: the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA). USDA has responsibility for most, if not all, of the orderly marketing policies, meat and poultry inspection and protection of the agricultural environment. FDA has responsibility for the safety of foods other than meat and poultry products. EPA is responsible for regulating major environmental policies including pesticides and new chemicals for agriculture. USDA has played a significant, if not dominant role, in regulating American agriculture. However, as the structure of agriculture and food processing continues to evolve and advances in technology permeate the food complex, USDA's regulatory role may change significantly.

U.S. Department of Agriculture

Key agencies within USDA include the Agricultural Marketing Service (AMS), Animal and Plant Health Inspection Service

(APHIS), the Food Safety Inspection Service (FSIS), Foreign Agriculture Service (FAS) and the Packers and Stockyards Administration (PSA). Through these agencies, USDA has implemented a significant portion of the legislation and promulgated a significant proportion of the policies pertaining to the food and agriculture complex. AMS and PSA, in particular, have been the primary agencies for implementing federal policies in agricultural marketing. Specifically, market information policies and programs, producer cooperatives, antitrust policies and marketing orders are the responsibilities of these agencies. The importance of these agencies diminishes as the rationale for orderly marketing policies weakens.

Food and Drug Administration

As an agency within the Department of Health and Human Services, FDA through the Food, Drug and Cosmetic Act, is responsible for insuring that domestic and imported food products sold in interstate commerce are safe, sanitary, nutritious, wholesome and honestly labeled.[7] With the emergence of biotechnology, FDA has the responsibility of regulating food products that are modified genetically. There is expanding sentiment among policymakers to consolidate all food inspection activities within FDA – including USDA meat and poultry inspection agencies.

Environmental Protection Agency

As a stand-alone agency, EPA has jurisdiction over two broad classes of products: pesticides and "new" chemicals. EPA regulates the manufacture, processing, distribution and use of pesticides and sets tolerance levels for pesticides in food and feed. In addition, EPA must screen any "new" chemical before introduction into commerce to determine if its use presents an unreasonable risk to health or the environment and is not otherwise regulated. EPA is forging a coordinated and consistent approach to its biotechnology responsibilities through the use of current legislation. Federal policymakers could conceivably place all crop biotechnology-related policy with EPA, thereby weakening the present plant inspection activities of USDA.

Summary and Conclusions

Orderly marketing concepts are economic in nature and are founded on notions of supply levels and price level and variability over time and space. This assessment has identified federal policies, based in whole or in part on orderly marketing, to include antitrust policies, market information policies and policies encouraging producer group action such as producer cooperatives and marketing orders. The legislative foundation for these policies fundamentally indicates concern for both producer and consumer economic well-being.

In general, orderly marketing and the economic concepts on which it is founded serve a food production, processing and distribution complex which presumes undifferentiated mass-marketed commodities at the farm gate. Structural change has witnessed an agricultural production system in which fewer and larger farms produce a substantial share of the total output at the farm gate. In addition, the food production and marketing complex is entering an era of rapid technological advance.

Biotechnology in combination with information technology certainly will exacerbate the already existing trend toward tighter vertical coordination of the food chain. Biotechnology promises to tailor particular inputs to enhance quality and other desirable characteristics of the raw commodity. With such technologies, more consumer-oriented strategies will become essential as previously standardized commodities are transformed into customized products. This era is likely to raise the economic importance of genetically-improved differentiated commodities tailored to specific end-use markets in which the marketing system is tightly vertically coordinated. The distribution system and the exchange arrangements use will increasingly need to accommodate specialized, value-added, identity-preserved products.

Initial structural adjustment induced by these technologies is apt to be greatest for those commodities for which orderly marketing historically has been most important. Soon, biotechnologies in particular, will affect the production of milk and the marketing of swine and fresh tomatoes. At present, perishability and seasonality are clearly significant characteristics for these commodities. The impact of these biotechnologies on future structural adjustment will tend to obfuscate the current food marketing system in which processors are constrained by the attributes and qualities of raw commodities produced at the farm gate.

One implication of this analysis is that structural changes and vertical coordination are accomplishing some of the objectives of orderly marketing that public programs originally were intended to encourage. In essence, private market mechanisms are developing that achieve, at least partially, some orderly marketing objectives. Accordingly, this suggests the need to separately evaluate federal government programs and policies intended to *facilitate* private market functioning and those intended to *monitor* private market behavior when and where welfare is being encroached. Programs and policies based on orderly marketing aimed at facilitating the functioning of private markets are more likely to endure obsolescence than those established for the purpose of monitoring. For example, market information policies based on broad facilitating purposes may need more careful future evaluation and scrutiny than those policies intended primarily to monitor behavior.

Substantial shifts in the future relative functions of government agencies also is likely. FDA and EPA will play an ever-expanding and portentous role in regulating the food and agriculture complex while USDA's role and importance simultaneously diminishes. Even the traditional areas of food safety and environmental safety, presently regulated by USDA, could be transferred to these respective agencies in an effort to coordinate and consolidate responsibilities and federal food policies.

In addition, traditional USDA policies concerned with orderly marketing will become less important for many commodities. As markets become more tightly vertically coordinated and technology is capable of adding more value to the product, as in the Calgene tomato case, less rationale exists for orderly marketing policies. As a consequence, some USDA policies based on orderly marketing concepts are likely to be de-emphasized in the future.

ENDNOTES

1. This manuscript represents only the authors' personal views. It is not intended to be, nor should be construed as, representative of the views or policy of any governmental agency. The authors wish to express thanks to David Hahn, Carl Zulauf and Constance Jackson for critical comments on an earlier draft of this manuscript. Any errors are the sole responsibility of the authors.

2. Another factor, bulkiness – in the sense of high transport cost per unit of value – could be considered a separate characteristic. However, the absence of bulkiness does not appear to change any conclusions regarding the definition of, or regulatory environment for, orderly marketing.

3. An interesting issues involves the economic "free rider" problem inherent in any voluntary self-help attempt to improve farm-level economic well-being through federal policy. The free rider issues often is an economic argument used in favor of establishing marketing orders, but, within legislation providing the foundation for orderly marketing, reference to the free rider problem is not explicit. Thus, the free rider problem apparently is an economic justification for marketing orders but not orderly marketing per se. See Masson and Eisenstat for an extensive discussion of the economic free rider issue relative to milk marketing orders.

4. Of course, countervailing power is not the sole reason for farmers' treatment under antitrust or for them to form cooperatives. For example, see Centner for a lucid exposition of additional reasons for farmers to organize into cooperatives.

5. In a strict economic definition, inadequate supply could occur only under a price ceiling in which supply is less than demand at the prevailing market price.

6. Most quantitative estimates for milk revolve around consensus on a ratio of production to demand. For example, quantitative estimates for milk center around a margin of total production 20 percent greater than Class I demand in a typical fall season. See Masson and Eisenstate, pp. 678-680, for more detail.

7. The patterns of legislation and policies regulating food safety actually have evolved quite slowly during the twentieth century. Technological advance in measurement over this time has proved arduous for policymakers in enforcing the Delaney Clause, for example. See Sporleder, Kramer and Epp for a more complete treatment of this subject.

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