Should Governments Support Food Product Differentiation Schemes?

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Introduction

The number of food products available in the U.S. market has proliferated dramatically in the last several decades. In 1980, over 2,000 new food products (measured in number of stockkeeping units, SKUs) were introduced to the shelves of U.S. supermarkets; in 1998, the number of new foods introduced reached almost 11,000. The 1998 figure included 671 new entrees, 520 new meat, fish and poultry products, 329 new vegetable side dishes, 561 new pasta side dishes, 300 new cheeses, 396 new types of cookie, 556 new ice cream or frozen yogurt products, 483 fruit and fruit-flavored drinks, and 252 new wines and wine coolers (Cox and Alm, 1998). And there were many more! The evidence of product proliferation extends beyond processed or packaged foods. The number of fresh fruit and vegetable products has risen sharply in recent years. For example, in 1987 the number of SKUs available in the supermarket produce department was 173; by 1997, it was 335 (Kaufman et al., 2000; Litwak, 1988 and 1998).

What the U.S. food market is experiencing is really the proliferation of food product differentiation, rather than the proliferation of distinctly new products. The essence of product differentiation is that product "differentiates" are "both similar and different—a table and an automobile are not related, but two different automobile models, or a Chippendale and a Danish modern table, are" (Lancaster, 1987). The study of product differentiation in food is not new. In fact, work by U.S. Department of Agriculture (USDA) economist Frederick Waugh represented one of the earliest attempts to measure differences in product quality (Waugh, 1920). For reasons discussed below, however, there are both more incentives and more opportunities for product differentiation in food markets now than ever before. An offshoot of this phenomenon is an increasing number of requests from segments of the food and agricultural sector for government actions that support product differentiation. It is timely, therefore, to consider what economic framework might be used to evaluate interventions aimed at sanctioning various forms of food and agricultural product differentiation.

Factors Driving Product Differentiation

The term product differentiation entered the economics literature in Chamberlain's work on monopolistic competition in the 1930s (Lancaster, 1987). Product differentiation requires two basic conditions: that there be variety in individual preferences and that technology makes variety possible. Another condition—the existence of economies of scale—limits the efficiency effects of product differentiation. As Lancaster (1979) noted, "If there are no economies of scale, then there is no reason why every product should not be custom made to suit every individual's preferences." The increase in food product differentiation in the United States—and undoubtedly in other developed countries—is a function of changes in all these factors. Demand for variety has certainly increased along with rising consumer incomes. Variety has become "…a wealthy, sophisticated society's way of improving the lot of consumers" (Cox and Alm, 1998). However, technological change is also increasing the technological possibilities for product differentiation in the U.S. food sector. For example, not long ago it would have been impossible to produce foods with certain combinations of characteristics, such as low calorie content but the rich flavor of a high-fat food. Food technology now makes such unlikely combinations not only possible but common. Furthermore, the advent of the application of biotechnology to food and agriculture has markedly expanded the potential for product differentiation.

Technological change, particularly in information technology, has also made the provision of variety to consumers on large scale much cheaper, bringing down fixed costs. Costs of supplying product information, customizing products during production, and distributing products have all come down sharply. Supply chain management has become important in the agricultural and food industry and throughout the economy. Because of this, some sectors appear to have moved beyond the age of variety to what is now labeled "mass customization," that is, the delivery of custom-designed products to the bulk of consumers at ever lower cost (Federal Reserve Bank of Dallas, 1998). A typical example of mass customization is the purchase of a new computer (over the Internet) tailored component by component to meet the buyer's precise specifications for size, speed, capacity, and many other attributes.

Product differentiation (through variety or customization) occurs because firms believe they can make more money by exploiting variety of preferences. In mature food markets, there are three incentives for a firm (or farm) to differentiate

their products. The first is to enlarge or at least sustain their share of a given (saturated) market for a particular type of food product. By introducing a new pasta product, for example, a company might capture more of the pasta market from competitors. The second reason is to expand demand for a particular product category by tapping into unrealized demand for variety. For example, the introduction of new exotic varieties of fruits might expand demand for fruits generally in addition to bringing about some product substitution. The third reason firms want to differentiate is to "soften" price competition (Tirole, 1998). When products of different firms are imperfect substitutes for each other, each firm can act as a monopolist in its own product. According to Lancaster (1987), "The potential for a monopoly mark-up (price higher than marginal revenue and thus marginal cost) together with reduced sensitivity to every move made by competitors provide the primary incentives for the firm to differentiate." How much a firm can mark up its product depends on how effectively it has segmented the product market or insulated its product from competition. The more differentiated a firm's product, the less responsive is demand to price, and the closer the firm can get to the exercise of monopoly power (Perloff, et al., 1994).

For whatever reasons—measurable or perceived quality differences, effective advertising, and brand reputation or loyalty are some of the reasons cited--there is considerable evidence that firms can succeed in realizing price premiums for differentiated products. For example, using scanner data, Barsky et al. (2000) find that markup ratios for nationally branded products sold in the U.S. retail grocery industry range from 2.5 for crackers and 2.3 in the analgesics category to 1.2 in canned tuna. Consumers in high- income markets seem to be willing to pay more for products differentiated in ways that appeal to their personal values. For example, Kuchler, et al. (2000) estimate that the price of organic apple juice is on average 137 percent higher than the price of conventional juice and that this premium significantly exceeds the estimated value of cancer risk reduction.

Product differentiation does, however, come with costs despite technological changes discussed above that make it more cost effective now than historically. Generally, the more versions of a product a firm produces, for a given output, the lower the output of each product variant and the thus the less the scale economies (Lancaster, 1987). A large farm that decides for example, to produce organic and nonbiotech grains, along with conventional grains, loses some of the scale economies

of bulk commodity production and takes on new costs to segregate and maintain product identity on the farm and in the marketing channels. Additionally, gains from product differentiation are likely to be eroded unless a firm (or segment of an industry) can prevent other firms from entering the market. This is particularly true if close product substitutes can readily emerge. For example, organic and conventional foods are imperfect substitutes for many consumers, but two organic products (e.g. two types of organic potato chips) are likely to be perfect substitutes. In the U.S., organic food prices have declined significantly as more producers have entered the organic market. The likely erosion of the competitive advantage achieved through product differentiation, coupled with the fact that differentiation bears costs, provides a powerful incentive to find mechanisms for limiting market access by other producers. This leads to some important questions about government support for differentiation.

Issues for Government Intervention in Differentiated Food Markets

"Only the few know the sweetness of the twisted apples" (Sherwood Anderson, *Winesburg, Ohio*)

Any rationale for government intervention in differentiated product markets is complicated by the nature of the product differentiation that underlies many such requests. Increasingly, many new or different types of foods are distinguished in ways that are not obvious to consumers upon visual inspection but that may affect taste or quality or otherwise be of potential value to consumers. If such quality attributes are revealed after consuming the good, maybe repeat times, these are known in the information literature as "experience goods" (Nelson, 1970). Wines and cheeses, for example, are often differentiated from other wines and cheeses with similar physical characteristics but different consumption qualities by *where* they are produced, that is, by a geographical indicator. Other foods are marketed as new or different because of characteristics that may not be evident to consumers even after having consumed the product multiple times. These are known in the information literature as "credence goods" (Darby and Karni, 1973). Organic foods and foods produced with non-biotech ingredients are examples of products that are distinguished

by *how* they are produced, but such information cannot be garnered through consuming the product.

These forms of product differentiation may be more common in the food sector because of the biological basis for food production, the importance of soil and climatic characteristics to quality, and the links that consumers make between certain production technologies and their own values or beliefs, such as concerns for animal welfare. These types of product differentiation also create situations in which producers know much more about the quality characteristics of their products than do consumers, creating an asymmetry in information available between the sellers and buyers. Correction of this asymmetry clearly requires the provision of more information. The policy question, however, is by whom and at what cost.

Theoretically, market failure associated with problems of asymmetric information can be solved either by private sector initiative (product differentiating firms do have an incentive to inform consumers of the product's desirable attributes) or by government intervention, or perhaps a combination of both. In either case, the costs of correcting the problem would ideally be balanced against the benefits of a solution. As a practical matter, for agriculture in the United States, government intervention is often seen as the solution of first resort.[2] Indeed, government has a long history of involvement in grading and other standard setting for bulk agricultural commodities and produce. It may seem a logical step, then, to extend the arm of government to address related problems of asymmetric information concerning differentiated product quality attributes. It is possible to argue that that is what happened with the recent USDA rule establishing national standards for food products bearing the label "certified organic." The same USDA agency that has historically performed commodity grading services devised and implemented the organics rule. While the benefits of government intervention may appear clear and immediate to those who seek sanction of a differentiated product, the costs may be less visible and more diffuse.

Producers of some differentiated foods and beverages have long recognized the value of government involvement in standard setting, certification, and enforcement. The reach and resources of the Federal government confer particular

[2] Kosher foods, however, provide an example of a case in the United States where private third-party entities set standards, provide testing and certification, and enforce truthful compliance with standards (Golan et al., 2000).

advantages. First, government coordination can reduce the transactions costs of gaining consensus on standard setting when relatively large numbers of producers are involved, as is often the case in agriculture, as well as shift the monetary costs of certification and enforcement to government from industry. Second, government participation in testing and certification imparts a certain authority to the differentiation of the product--credibility that private advertising or even private third party certification might lack. Third, the government possesses unparalleled power of enforcement of any standards set. All this can add up to an effective barrier to entry to potential new suppliers, which of course makes it more likely that the initiating producers will enjoy the benefits of monopoly pricing. This is a familiar outcome in agriculture, where the purpose of government intervention is often to transfer income to agricultural producers. Of course, to the extent that the scheme reflects consumer preferences accurately, consumers can benefit too.

Examples abound of appeals to the government to establish or refine standard setting schemes for differentiated products. In California, a group of winemakers in a particular portion of the Russian River Valley have petitioned the Bureau of Alcohol, Tobacco and Firearms to redefine and reduce the area included in the Russian River Viticultural Area. They site the cool coastal fog as the most important factor distinguishing the quality of their wine from that produced in other parts of the valley (Prial, 2000). Recently, cheese producers successfully petitioned USDA to establish by regulation a standard governing the size and number of holes in Swiss cheese (USDA Agricultural Marketing Service, July 19, 2000).

A government solution may fail, however. Setting aside the possibility of bureaucrats steering the intervention to suit their own interests, even a well-meaning government may not be able to figure out “true” consumer preferences. These preferences are usually simply represented to them by the producer of the differentiated product, and while there is self interest at work (producers sell more if preferences are correctly identified and reflected in standards), producers may not actually be able to gauge consumer preferences accurately. And, even if producers know the preferences at the start, these preferences may change over time. Then the challenge is to recognize the change and to adjust the standard accordingly. But the government-backed standard may be difficult to adapt to a new situation. The U.S. federal regulatory system is notoriously cumbersome, perhaps expressly in order to resist easy change. The requirements for extended public comment alone guarantee a

long process. Further, there is a potential cost to the initial producer group imposed simply by winning establishment of government standards. Transparent identification of the characteristics of the product, or more importantly of the process being sanctioned, could attract new entrants. Barriers to entry might be lowered for potential producers who were uncertain about the exact differentiation sought by consumers. The resultant increase in supply erodes the sought-after monopoly price differential but may create gains in consumer welfare.

The United States has already had experience with the establishment of commodity grading standards that either missed the mark with respect to consumer preferences initially or became obsolete as preferences changed. Federal cosmetic standards for fruit and vegetables often fail to provide consumers with the right information about non-visible traits like taste. For example, apple producers continued to produce varieties that met all the highest cosmetic standards while consumers migrated to tastier, but less visually appealing, varieties. In maintaining barriers to entry even with government intervention, French wine producers have devised an effective way to restrict the number of producers and keep the price premium in place. The *appellation controlle* relates a wine to the geographic location of its production. Since only so many grapes can be grown in a designated physical space, the geographical indication naturally restricts entry.

Conclusions

The theory of monopolistic competition helps explain why firms or industry groups seek government intervention as they develop and introduce differentiated products. However, the question of appropriate government involvement in redressing information asymmetries associated with product differentiation—such as through standard setting, certification, and enforcement--is not easily resolved. Health and safety issues aside, there does not appear to be an obvious set of criteria for determining whether and when government involvement would be beneficial in relation to private alternatives. Is there some way to make a judgment other than to reduce it to an empirical question, explicitly toting up potential costs and benefits for each situation? Looking at the products for which USDA grading standards have been established, it is hard to tell what rationale was used. There are quality standards for

gladiolus and peonies but not for roses, and for tomato but not pepper plants (USDA Agricultural Marketing Service Web site, www.ams.usda.gov).

In the United States, the institutions with historical roles in facilitating commodity marketing are increasingly being asked to take on new functions related to product differentiation. Are there other institutions and mechanisms that can address the asymmetry of information? For example, can trademark systems or other forms of intellectual property protection serve as effective means of product identification? Can standardized private codes such as those found in ISO provide alternatives to direct government responsibility for standard setting (see, for example, Wall et al., 2001)? These kinds of questions will become more important as food and agricultural product differentiation continues apace. International questions of appropriate standard setting approaches are already raised, with respect to biotechnology and also animal welfare, to give two examples. A fair bit would seem to be at stake, for domestic and world markets.

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