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GMO LABELING: EFFECTS ON CORE BUSINESS OBJECTIVES IN THE GRAINS VALUE CHAIN

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Roger G. Ginder
Economics Department
Iowa State University

ABSTRACT

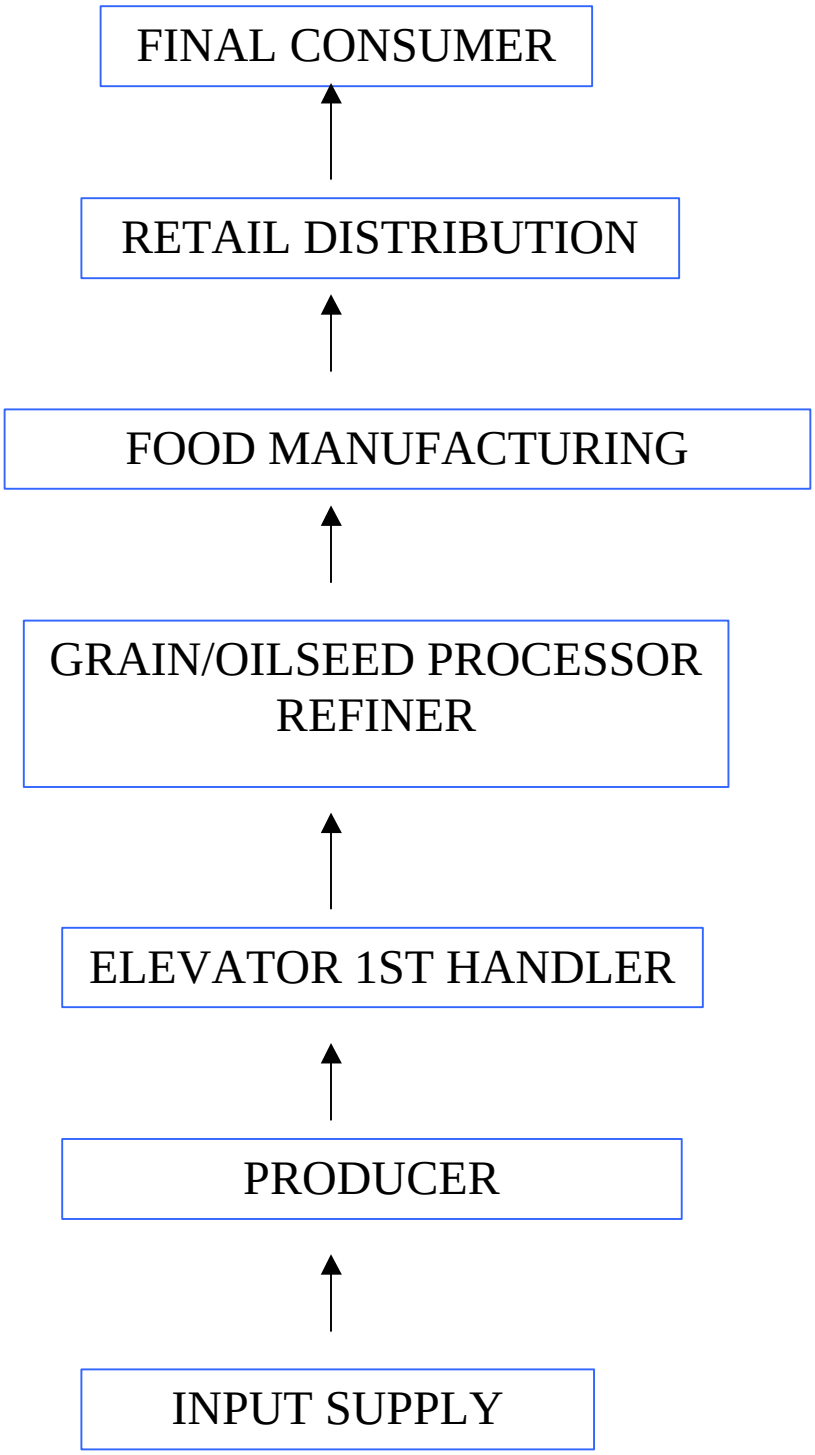
GMO labeling of food in countries importing U.S. grain and processed grain products will create a need for identity preservation. Identity preservation of non-GMO product will be required to make labeling of non-GMO products practical. It will also create the need for greater communication, coordination, and understanding among firms at all levels in the market channel. The core business objectives for firms operating at each level in the channel from production to food retailing are identified. The possible effects that imposing identity preservation will have on the core objectives of firms operating at each level in the value chain are then discussed. Core objectives in the retail and food manufacture sector are driven more by brand and product image. Core objectives of producers and elevators are driven by volume and cost. Labeling will create cost increasing changes and uncertainties at lower levels in the channel as producers, elevators and processors adopt identity preservation. Labeling will create increased costs and in some cases, substitution at the manufacturing and retailing levels. An increasingly concentrated retailer sector will be in a position to apply leverage on the labeling question.

The controversy surrounding genetically modified organisms (GMO) which began in Europe has begun to appear in other parts of the world as well. While there are some aspects of the controversy which may be attributed to trade posturing and activities of consumer and environmental groups, the issue has now grown beyond one of artificial trade barriers or activist groups. Several mainline European food retailers and food manufacturing firms have perceived consumer concerns to be significant enough to begin labeling consumer products containing genetically modified grains and oilseeds. Other importing countries are beginning to establish guidelines and labeling requirements including the Japanese.

It now appears that labeling with respect to GMO content will become necessary to serve consumers some key export markets. If labeling is to have integrity, it will require strict segregation in both in production and in movement through the marketing channels. At first glance, it would appear to be an obvious goal for all firms in the channel to pursue. Consumer satisfaction is why market channels are developed and exist in a free open market economy. Although segregation of traditional non-GMO products from those products produced from new biotech seed seems to be a simple approach to the problem, it will have far reaching effects on virtually every level in of the market channel for U.S. grains and oilseeds. To accomplish segregation, firms at each level of the market channel will be forced to cooperate more explicitly and coordinate their activities far more effectively than they have in the past.

Providing what the consumer wants and is willing to buy as economically as possible is what the channel has always attempted to do. The firms in the channel and the channel itself have accomplished this shared goal effectively in the past. However in the past, it has been accomplished in a market channel using bulk handling of fungible commodities defined by general grades and standards, impersonal competitive open markets for those commodities between levels, and decentralized discrete decisionmaking by firms at each level in the channel. Segregation and identity preserved (IP) handling presents a significant challenge to each of these past practices.

Figure 1. Human Consumption Market Channel for Grains and Oilseed



The first casualty is likely to be discrete decentralized decisionmaking -- especially at the levels in the channel prior to food manufacturing. Firms at each level in the channel have tended to optimize activities at their particular level with little regard for the activities at other levels. To date, most communication between firms at the lower levels in the channel (i.e., below the food manufacturing level) has been conducted in the impersonal language of commodity grades and prices with little additional overt cooperation.

CORE OBJECTIVES AT EACH LEVEL

Delivering a product which has been segregated and identity preserved (IP) through the market channel will require a lot more communication among the firms at these lower levels than has typically existed in the past. But it must go beyond simple communication. Greater cooperation and a mutual understanding among firms at all levels in the channel -- from the genetics companies all the way through to the food retailer -- will become an absolute necessity for successful segregation and IP.

Successful firms develop core objectives to pursue and master them. At each level there are typically 3-5 performance areas which firms must master to survive and compete effectively. These "core" performance areas define the competitive environment and differ from one level in the channel to another. Firms at each level in the channel will need to better understand the core objectives of firms at other levels.

The core objectives that firms at each level in the channel have developed for their business activities are well adapted to the current undifferentiated bulk handling system for grains and soybeans. Segregation and IP will create stresses on these core objectives and create issues throughout the channel which can only be resolved through more formal communication. In many cases, these changes will involve added costs and different incentives. To understand the adjustments necessary for the system to segregate and IP, it is useful to understand: (1) the core objectives of firms at each level and (2) the issues that arise when identity preservation is imposed.

GRAIN AND OILSEED PRODUCTION LEVEL

Agricultural production operates in a purely competitive market structure. The position of producers in the channel is somewhat paradoxical. Farmers occupy the weakest and (at the same time) the most influential position in the channel. Although farmers cannot set price for their products, they collectively determine total quantity produced, how it is produced, where it is produced and the genetics used in producing it. Elevators, processors and ultimately consumers have in the past accepted the product farmers have decided to produce. Input suppliers have responded with the inputs farmers have demanded for use in the production process including the genetics used.

But farmers have traditionally been price takers with little direct control over unit price of their products. Thus, their core business objectives have been focused primarily on cost and volume. The core business objectives at the production level have been to achieve low production cost per unit and to achieve the size required to generate sufficient income for family living, asset replacement, and in most cases, growth. Achieving low per unit production cost is a

necessary condition for accomplishing the income objective. Higher cost producers with no control over price have difficulty maintaining income or growing and may even consume their assets over time.

Production management problems are therefore of critical importance to farmers. Key farm level production management problems include: (1) selecting appropriate tillage systems to get optimum yields, avoid erosion and meet the conservation requirements of operator and/or landlords; (2) effective weed, insect, and disease control to avoid yield and quality loss; (3) maintaining cleanliness and good condition of grain produced; and (4) minimizing the cost of purchased inputs and equipment per unit produced.

Many of the genetically enhanced products recently introduced have been aimed toward assisting farmers to accomplish one or more of these production management objectives. While biotech products may not fit into all farm production situations, their relatively rapid adoption by producers indicate that they provide benefit in a significant percentage of operations. Products with herbicide or insect resistance may contribute to yield increase, per unit input cost reduction, enhance the cleanliness and quality of the grain produced, and permit selection of tillage systems that reduce or minimize erosion on risky soils. These benefits fit with the core objectives at the production level.

PRODUCTION LEVEL PROBLEMS RELATED TO IP AND LABELING

The need to produce crops that are GMO free in order to meet new labeling requirements will create several types of problems at the production level. The first and most critical question facing producers is market access. Commodity corn and soybeans have been interchangeable across the food, feed, and industrial markets both domestically and in export markets. Labeling and identity preservation are likely to eliminate some potential markets for GMO products. Non-GMO products are likely to be marketable for all uses. Labeling and identity preservation will require producers to consider the benefits of broad market access and weigh those benefits against the cost reductions, quality improvements or environmental advantages obtained from planting GMO seeds.

Related is the question of price differentials between GMO and non-GMO grain and soybeans. In general, it is accepted that a premium will be paid to cover the added cost associated with producing non-GMO products and preserving their identity. Producers of identity preserved non-GMO grains may not be able to obtain premiums if they sell their non-GMO grain into some markets. Without premiums, the added costs of IP can not be recovered.

Two types of added costs for non GMO grains need to be considered. Added costs include any production cost savings from using GMO traits that the producer must forego as a result of not planting biotech seed. They also include the added cost of the IP handling procedures required to assure that the product is GMO free within acceptable tolerances. The level of both types of cost will vary from one operator to another and with the crop planted.

Isolation of non-GMO fields is one example. For crops where cross-pollination is possible, there are additional costs associated with isolating fields of non-GMO crops to prevent pollination with airborne GMO pollen from another field. Farmers must identify the genetics of nearby fields and plant another crop in a buffer zone to avoid accidental contamination by GMO pollen. This is a cost that did not exist prior to the adoption of biotech products but now must be

factored in to assure non-GMO status. It represents an added cost over what is required to produce commodity corn.

Uncertainty about the level of demand for non-GMO vs. GMO grain is also a serious problem for producers. There can be no assurance of whether or not the market for them will grow or shrink. Even in countries where labeling has been adopted have little track record about how consumers will actually respond when confronted with higher prices. The biological production cycle (which has always set production agricultural apart from other industries) magnifies the risk farmers must face in making this decision. Unlike typical manufacturing operations, the characteristics of entire supply is established at planting and cannot be significantly altered. Farmers must plant a crop in the spring of the year which will create the supply that will be marketed up to 18 months into the future (and even further if there are significant carryover stock). For example, the crop planted in April of 2000 will be used in the period September 2000-August 2001.

ELEVATOR FIRST HANDLER LEVEL

First handler elevators operate in a monopolistically competitive structure. With the readily available truck transportation they have only a very limited ability to control price within a very limited geographic area. They also sell into a much more concentrated export and processing sector. Thus, the sector resembles a purely competitive one more than an oligopolistic one.

Elevators (or first handlers) purchase and assemble grain and soybeans from numerous farms and ship to intermediate or end users. Most elevators operate on very thin margins - usually less than 10¢/bu ($3.95/MT) for corn and 15¢/bu ($5.50/MT) for soybeans. A core objective of elevators is to obtain high levels of efficiency (low cost/unit) in receiving, handling, storing and shipping of grain. These efficiencies are typically obtained by running high volumes of standardized commodity products through their facilities with a minimum of special handling.

Assembly of commercial sized lots is accomplished by commingling products produced on numerous farms under broad commodity definitions to create large lots which may be transported at lower cost. Since only broad generic commodity definitions are used to describe lots, the genetics in them vary widely. Commercial lots represent more or less random combinations grain from a large number of different hybrids or varieties with no attempt to identify or specify genetic content.

In addition to the objective of handling sufficient quantity to reduce costs, the elevator system has an objective of keeping and maintaining quality of the grain received. This may involve drying, cleaning or other types of conditioning to ensure that quality is maintained in handling and storage. Once again, the ability to commingle inventory reduces the per unit costs and the equipment required to dry and condition inbound grain.

Since elevators own and store grain for a period of time, price risk management is also a core business objective. Elevators typically hedge or contract future sales to minimize these risks. In doing so, they provide an important inventory function in the market channel. However, the effectiveness of current hedging and contracting activities have depended on product fungibility and the ability to freely substitute one lot for another.

Finally, a major objective of elevators is maintaining market flexibility and access to alternative markets. This permits the elevator to move inventories to a wide variety of

intermediate or end users in response to market price differentials. Although the opportunities to obtain the price differentials are very short lived and have relatively small margins, it is critical to have the ability to move grain to the best available markets in response to immediate market conditions. While they may be difficult to quantify, merchandisers consider them to be very real. Most grain merchandisers maintain that added margins can be generated through this kind of market flexibility during practically any marketing year. It is impossible to identify a *priori* where the opportunities will be, when they will come, how often they will come, or how large they will be. Most would expect 2-5¢ to become available.

ELEVATOR PROBLEMS AND COSTS RELATED TO IP AND LABELING

Identity preservation of non-GMO lots will create several problems and added costs for elevators. The most obvious is the need for segregation of what would otherwise be a fungible commodity. While segregation is feasible in many elevators, it will add cost in both storage and drying activities. In most cases, the IP product will have to be treated as a unique commodity among the others that an elevator handles. The inability to commingle inventories could be especially costly during harvest when limited dryer capacity already creates a bottleneck in operations some years.

Rapid testing and genetic verification is a potentially critical problem area for originating elevators. Current grading and moisture testing can be conducted quickly during a busy harvest with minimal disruption in receiving. The absence of rapid tests for genetic content will, in many cases, slow inbound traffic during harvest. Although testing technologies are improving with respect to cost, reliability, and speed, those currently available do not perform well as would be desired in any of these areas. Even with improved testing, there are stringent tolerances for GMO content (less than 5%) which seriously complicate the selection of a representative sample. Sampling protocol and reliability is critical when the value of large lots are to be established based on a series of relatively small samples. As the entry point in the grain logistics system, the originating elevator must deal with a larger number of inbound sources than most other points. Where a large volume is handled, the potential for loss of financial value as a result unreliable sampling and testing can be high.

Identity preservation may also slow accumulation of commercial sized lots for shipment. Because an inventory that could normally be commingled must be segregated, the time required to accumulate quantities of either GMO or non-GMO large enough to ship is extended. Additional interest and other storage costs are generated as a result. Smaller lots could be shipped more frequently to avoid the resulting storage and interest costs. However, the increase in transport costs for smaller lots usually equal or exceed the savings in interest and storage costs from more prompt shipment. The problem can be further aggravated when the elevator has made contract commitments with railroads or purchasers for a minimum number of trainload shipments over a specified time period.

Inventory price risk must also be managed in different ways. IP shipments must be coordinated with the ability of processors, exporters or other users to receive and handle them. Elevators owning inventories are not as likely to be able to hedge and ship these inventories in response to basis signals as effectively as they typically do with commodity inventories. Unless solid price guarantees with built in storage and carrying charges are incorporated in IP sales agreements, the elevator could be exposed to added price or inventory value risks. Without such

assurances, grain purchased at a premium from producers in January may not be marketable at the same premium later in the year or at the time that the buyer calls them. Even where a constant premium holds, its real value may be eroded if it is not marketed early enough in the year to make the premium worth what it would have been earlier. If the purchaser does not call the grain early, higher storage and carrying costs incurred and may even exceed the value of the more modest premiums.

PROCESSOR LEVEL CORE OBJECTIVES

The corn and soy processing business is oligopolistic with a competitive fringe consisting of a large number of very small (often very specialized) firms. The four largest firms in most cases account for a majority of the volume.

Steady flows of inbound volume is a core business objective of most grain and soybean processors. Processors (like elevators) are concerned with full plant utilization and maintaining sufficient volumes of product to assure high levels of utilization. However, unlike elevators, processors tend not to carry large inventories throughout the marketing year. Instead, most keep less than 3 weeks grind on hand. In order to realize receiving, transportation and handling efficiencies, most processors attempt to get regular product deliveries into the plant year around except for a short shutdown period each year major maintenance is done.

A second core business objective of processors is continuous plant operation at high levels of capacity utilization. Variations in plant volume and/or shutdowns of plant facilities raise per unit costs and are generally avoided. Since the scale of both corn and soy processing plants tends to be large, significant volumes are required to maintain continuous 24 hour operations. Continuous operation also permits transportation and shipping efficiencies on the outbound volumes of processed product.

Both these objectives contribute toward the processor's ability to operate at competitive processing margins -- a third core business objective in the processing sector. Processing margins represent the difference between the cost to the plant for raw soybeans (or corn) and the price received for component products after processing. In corn wet milling for example, the value received for alcohol, corn sweeteners, gluten feed or other components must be larger than the cost of raw product plus processing costs. In soybeans, the value of soy oil, soy meal, lecithin and other component products must exceed the cost of soybeans and the processing costs if for the processor to be profitable. When raw product prices are high relative to prices for component products, less efficient higher cost plants may not have a large enough differential to cover costs. When processing margins are lower, plants with the high at cost capacity are often squeezed out of production.

In most cases, the markets for component products tend to be more commodity-like than differentiated. Thus maintaining the processing margin involves risk management in both the procurement (e.g., soybeans) and the output (e.g., oil or meal) commodity markets. Since the market for the output side is composed of a variety of co-products, there is a need to balance the blend of margins from component products against procurement cost for raw product feedstock. Some processors have developed more specialized differentiated output products and can gather value added returns from these sources. In the case of corn and soybeans, most of the co-

products move into either the human food or livestock feed markets. However, there are increasing amounts of both corn and soy moving into industrial product channels.

Another core business objective for processors (at least to date) has been to maintain market flexibility for the products produced -- especially for the bulk commodity items such as oil, soy meal, gluten feed, and alcohol. Market flexibility permits these products to be sold and shipped to a wide variety of customers and selection of the most profitable ones at any given time.

Product yields are also a core business objective for processors. Since cost of running a unit of product through the plant do not vary greatly, raw product (corn or soybean) that yields more output co-products and/or more of the higher value co-products provide better processing margins. Processors have long recognized differences in product yields for raw product grown in different geographic locations. Differences even occur among crop years in the yields of output co-products.

Finally, processors have a core objective to maintain an image and reputation for producers high quality, wholesome, safe products. This is especially true for those co-products they sell into the human food value chain. Co-products moving into the human food chain may be bulk commodity (or high volume) such as soy oil, corn oil or corn sweeteners or more specialized value added products such as soy lecithen or specialized corn starches. Whether bulk or smaller volume value-added products, processors guard the quality and wholesomeness reputation for their product.

In all cases, reputation for safe high quality food products is important. Because co-products the processor sells must compete with substitutes in the market, they must not only be cost competitive but also viewed as high quality and safe. Food manufacturers and consumers will search for safe substitutes even if they must pay a higher price when there are serious questions about quantity or wholesomeness.

PROCESSOR LEVEL PROBLEMS RELATED TO IP AND LABELING

When the inbound product must be handled IP, it is necessary for processors to manage receiving and short term storage of inbound feedstock inventories more carefully. In most cases, there will be added costs for cleaning inbound receiving and storage facilities when switching from commodity to IP lots. Where special plant runs are made with IP corn or soybeans, plant down-time and cleaning costs are incurred. In plants not designed for rapid change-over, time loss can be significant. The time and cost to shut the plant down and clean out the various parts between commodity runs and IP runs must be recovered in premiums.

Added costs are also incurred to schedule inbound deliveries in a way that minimizes shutdown and clean-out time. In some cases, the non-GMO hybrids or varieties available may contain lower levels of key components such as protein, oil, and starch. Where the varieties in the IP shipments yield lower average levels of salable co-products, there may be additional costs resulting from reduced product sales.

Finally, there may be costs associated with the loss of market flexibility. IP products are likely to have a narrower range of markets -- at least from buyers willing to pay a premium. It is difficult to accurately apply a cost to loss of market flexibility since market opportunities appear on an irregular basis and the level of gain from them varies. However, most commodity merchandisers recognize that they are real and there are costs to giving them up.

The fact that processors have food quality and safety as a core objective as well as efficient handling and processing operations, places them at a critical point in the channel. They must be responsive to the pressures and concerns of their raw product suppliers as well as the needs of their customers in both the livestock feed sectors and the human food sector. It is at this point where focus in the channel begins to change from a low cost bulk handling focus to a differentiated product focus.

FOOD MANUFACTURING LEVEL

Food manufacturing includes a wide range of industries using processed corn and soybean products as ingredients to produce grocery products. Often one large firm will produce products in numerous grocery categories. Most of these industries are concentrated with the majority of business volume concentrated into the hands of a relatively few large firms.

Food manufacturer's business objectives also include plant efficiencies and low ingredient product costs delivered into the plant. However, core business objectives are generally much more consumer focused than ingredient or plant cost based. Value added and brand margins are a critical factor to the success of major food product manufacturers. Heavy investments are made in advertising and promotion to develop a positive brand image recognition and standing with consumers. Brand name recognition and approval by consumers are an intangible asset on their balance sheets but that asset has been purchased by the very real investment of capital in advertising and promotion. Maintaining viable brands and the added margins above manufacturing cost they can generate is one of the most important core business objectives for food manufacturers in most industries.

Competitive position against competing brands is also a core business objective. The value of a brand can be quickly eroded by competition if it is not carefully managed and protected. Research and development, continuous product improvements and high product quality standards are required to maintain competitive positions. An attempt is made to differentiate products from similar products of competing manufacturers

A related core business objective is the product integrity behind the brand name. A careful and consistent formulation of component ingredients meeting strict specifications for quality is required for nearly all branded products. While manufacturers are cost conscious in sourcing ingredients, the quality standards are usually sacrosanct and not casually traded off against price. Certainly manufacturers will attempt to source ingredients at as low a cost as possible and larger volume manufacturers have significant leverage against processors and other ingredient suppliers. But in the final analysis, quality specifications are usually non-negotiable.

Access to consumers through retail markets is perhaps the most critical core business objective for food manufacturing firms. Brand recognition and competitive position against competing brands are extremely important in gaining retail shelf space and thus support this objective. In addition, food manufacturers frequently purchase shelf space through a mechanism known as "slotting fees." In essence, these amount to a partial rebate of these brand margins to the retailer in exchange for shelf space and access to a large number of consumers.

Food manufacturers without strong brands (or in some cases food manufacturers with strong brands who wish to improve unit manufacturing and distribution costs by increasing their plant volumes) may also access the retail market through private label products as a core business objective. Private labeling involves producing products to a retailers specification and

branding them with the retailers label. Margins on these products are typically much lower than those on branded products, but they permit the manufacturers to access shelf space without slotting fees. To the degree that private label business increases, it enhances the retailer's price and service leverage against the manufacturer.

EFFECTS OF LABELING AND IP ON MANUFACTURERS

Where there are serious consumer concerns about the wholesomeness or safety of ingredients used in manufacturing a branded product, the food manufacturer are likely to be very risk averse. Loss of consumer confidence or brand loyalty can represent the loss of huge advertising investments in the brand. In the face of widespread consumer concern, most food manufacturers will seriously consider the purchase of IP grains and labeling as a prudent action required to protect a valuable asset which generates their value added margins. While small increases in input ingredient costs are important over large volumes of ingredients, they are likely to be viewed as less important than loss of consumer confidence. Very large increases in ingredient costs may result in substitution when ingredients with similar qualities are available.

When retailers apply pressure and the risk of losing shelf space looms, the decision is likely to become even more clear. Those who produce private label branded products for food retailers are more or less forced to use non-GMO ingredients if the retailer demands a non-GMO label. Even when the manufacturer does not elect to use non-GMO ingredients, the retailer can use shelf access as leverage. The manufacturer is left with a choice of losing the retailer's business or meeting the non-GMO specifications.

To some degree, the difficulties labeling will create for food manufacturing firms is related to the number of grain based ingredients in these product formulations. Where the formulation has relatively few ingredients processed from grains or oilseed potentially produced from genetically modified seed, there will be less difficulty in sourcing GMO free ingredients or substitutes. Where there are a large number of ingredients in the product formulation, the opposite is true. For example, a product containing corn flour, soy oil, corn sweeteners, soy proteins, and soy based stabilizers or emulsifiers will create more serious problems than a product containing only one or two such ingredients.

Another potential problem labeling may create for food manufacturers is a problem of product reformulation when an insufficient quantity of non-GMO sourced ingredients are available (or available only at an unacceptable price). Use of substitute ingredients will not visibly affect product characteristics in some cases. However in the case of other substitute ingredients, important product characteristics may be affected in a way that is visible to the consumer. In these cases, brand integrity could be adversely affected. In the short run, food manufacturers with heavy investments in brands can be expected to resist substitution and pay higher prices in these instances. In the longer run, ingredient components that contain GMO’s may be avoided altogether as formulation for new products are established. When non-GMO substitutes are readily available at a lower cost than corn or beans with added IP cost this could occur.

MASS MARKET FOOD RETAILING SECTOR

The food retail sector has become increasingly concentrated. Recent mergers among top firms and the entry of Wal Mart into the food business have resulted in a significant shift of power toward the retail level. Loss of brand access to one or more large retail chains is significant for even very large food manufacturers.

Food retailers have as their most critical core business objectives developing and maintaining a large volume of customer traffic. To be successful as a gateway for food manufacturing, a retailer must first get the consumers to enter their store. Failure to accomplish this places a ceiling on potential profitability and the retailers ability to operate effectively.

Mass market food retailers pursue other core business objectives in support of the customer volume and traffic objective. Retailers strive to have the appropriate product mix to meet customer expectations as a core objective. Most invest heavily in name recognition and image among consumers. While various types of images may be pursued, food safety and wholesomeness is a universally pursued image.

Another core business objective is the allocation its primary resource - shelf space - in ways that will generate a high level of profit. In pursuit of this objective, retailers typically use a combination of premium priced (manufacturer's brand) products which may generate slotting fees and lower priced private label (store brand) products. In many cases, store brands generate higher profit margins than branded products (even at slightly lower prices) since their cost to the retailer is generally lower from the manufacturer.

Finally, food retailers have a core business objective of competitive positioning with other food manufacturers. Retailers generally seek to become large enough to negotiate with manufacturers from a parity or superior position. Bargaining position is important in extracting slotting fees and product price concessions from manufacturers which increase retailer margins and permit the retailer to hold a low cost image with consumers.

EFFECTS OF LABELING AND IP AT RETAIL LEVEL

Retailers' critical core objective of generating customer loyalty and a large volume of regular customer traffic appears to require that they meet the customer demand for labeled products. Initiating labeling will require that manufacturers source GMO free ingredients from processors and that processors source GMO free raw products from first handlers or producers. The retailer occupies a strong position compared to other firms in the channel due to its position as the final transaction point with the ultimate consumer. The retailer can demand GMO free products and refuse to purchase other products setting off a chain reaction in the channel. Recent experience in the EC indicates that at least some retailers have been willing to demand labeling in the face of perceived consumer demand for it.

However, many of the cost impacts of identity preservation required for labeling occur at lower levels in the channel. It may be difficult for retailers to demand GMO free products without an adequate price differential to cover these costs. Prior IP costs incurred at lower levels in the channel will eventually need to be incorporated in the price of products at the final transaction with consumers. When the IP cost differentials are very high, retailers are likely to experience price resistance from consumers. The retailers may simply refuse to purchase the

product altogether or (especially in the case of store brands) ask the manufacturer to reformulate using non GMO substitutes. While neither of these outcomes is totally desirable for the manufacturer or the retailer, both are likely to occur for some products.

Labeling also creates problems in product mix and shelf space allocation. It will be impractical in most cases for retailers to carry two facings (one GMO and one non GMO) for each stock keeping unit (SKU) the retailer now stocks. In some cases, only one will be included. When both are offered, it will result in elimination of some other products to make shelf space room.

SUMMARY AND CONCLUSIONS

The market channel for grains and soybeans is well suited to bulk commodity handling. The GMO labeling issue will create the need for separate handling of GMO and non GMO products through the channel. Firms at different levels in the channel are well adapted to the existing competitive conditions at their level. They have developed and pursued core business objectives that allow them to compete effectively. Although the core business objectives at each level tend to be homogeneous, there are huge differences in core business objectives between different levels in the channel. Those at the production and first handler are more cost centered. Those at manufacturing and retail tend to be brand and customer image centered.

Imposing labeling and identity preservation on the channel will impact the core business objectives of firms at all levels. Manufacturers and retailers with brands to protect are very likely to adopt labeling and/or non GMO policies in order to protect positive customer image and loyalties. Firms in these industries appear to be risk averse and vulnerable to even implied threats of consumer backlash against their brands. Thus, it is quite possible that labeling could be self-imposed by manufacturers and retailers. Experience in Europe indicates this could occur quickly.

To meet labeling requirements of food manufacturers and retailers identity preservation costs will be generated at the production, the first handler and the processor levels. Core business objectives of firms at these levels will be affected as well. Uncertainties about where the market for GMO and non GMO products will create a major problem for firms at lower ends of the channel. Farmers must anticipate what demand will be into the fourth quarter of 2001 as they plant in the spring of 2000. This will be extremely difficult given the current market uncertainty. Elevators must determine how forward contracts with farmers will be handled.

Processors occupy a unique position in the channel. They must bridge the gap between the production side and consumer side. They will incur many of the IP problems and costs that exist on the commodity side but will also face the consumer image problem as they deal with food manufacturers on the output side.