VERTICAL ORGANIZATION AND COORDINATION IN THE CITRUS AND TART CHERRY SUBSECTORS*

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INTRODUCTION

Tart cherries and citrus are both perennial tree crops grown by a large number of growers. Both of these crops move through at least two or three vertical stages between farmer and consumer. Cherries and citrus are both marketed as relatively undifferentiated commodities at certain stages of the subsector marketing system. There are a number of similarities in the vertical coordination challenges and linkages of these two subsectors. There are, on the other hand, some notable differences which contrast the two subsectors in regard to certain coordination features.

Crops such as citrus and cherries face a number of vertical coordination challenges. These include (a) short-run supply and price fluctuations, (b) substantial risks, (c) price discovery uncertainties, (d) differences in market power positions, (e) difficulties for effective commodity demand expansion and consumer access, (f) the need for a long-run supply-demand balance, and (g) inadequate market information for the participants.

Supplies and prices for both citrus and tart cherries often fluctuate substantially. Fluctuations occur primarily because of weather variations, e.g., a freeze.

Large supply and price fluctuations occur especially frequently with tart cherries. These fluctuations are probably the single most important coordination challenge for the cherry subsector. This situation affects market behavior of the cherry subsector participants in many respects. Supply and price fluctuations for citrus occur less frequently, but also have important effects on coordination and behavior in that subsector.

Both the citrus and the cherry subsectors involve substantial risks to the participants. These risks affect behavior in many ways and results in strategies

to reduce risk or to shift the risks to other system participants. Substantial risks are associated with the wide fluctuations in short-run supplies and prices. There are also risks associated with the long-term, highly specialized investments such as in orchards.

Some participant groups have been fairly successful in shifting certain risks to other particpant groups. For example, retailers have been able to shift most of the risks associated with short-run price changes and inventory ownership to processors. Processors in turn have been able in some cases to shift substantial risks to growers through such arrangements as participation plans. A key question relative to risk bearing is, "Are the risks borne primarily by participant groups who have the greatest ability to minimize the risks?"

Price discovery uncertainties arise in part because these commodities are sold through a marketing system with several vertical stages. Price discovery uncertainties are pronounced for tart cherries, since most are retailed as an ingredient in branded products such as frozen pies and desserts. Price discovery in the commodity markets for cherries (between processor and food manufacturer and grower and processor) is usually done in an environment of substantial uncertainty because of the wide market fluctuations. These features lead to special challenges for vertical coordination relative to the price discovery process.

Both the citrus and cherry subsectors need effective demand expansion and consumer access for their commodity. This is especially challenging since the retail and food manufacturer portion of the U.S. food system are not basically commodity oriented. The challenges are especially great for tart cherries which is a minor commodity. Both cherries and citrus need to attain effective consumer access through retail grocery display space, through product lines of

manufacturers and through the menus of food service firms. Advertising can also be important. Successful consumer access involves effectively working with and through grocery and food-service retailers as well as with food manufacturers with strong brands.

A number of vertical coordination challenges may be affected by differences in the market power position of the participant firms. Market power may be affected by a number of factors in addition to the size and number of firms such as measured by the concentration ratio. Factors affecting market power include an ability to make consumer-access decisions such as on shelf space, product lines, and network TV advertising decisions. Market power may also be affected by particular laws and/or by special institutions such as grower bargaining associations and laws designed to strengthen the position of grower bargaining.

Tree-crop industries such as citrus and cherries face particular vertical coordination challenges because the orchard investments are very long-run in nature and are highly specialized investments. Thus grower-investors must be commodity oriented and have a long-run orientation in their investments. Grower-investors need to balance aggregate productive capacity with aggregate long-run demand for their commodities. Accurately predicting long-run demand in the U.S. economy which can change rapidly is difficult. The vertical coordination challenge is complicated by the fact that those portions of the subsectors which are able to influence demand, i.e., manufacturers and retailers, do not have a long-run commodity orientation and may be several stages removed from the commodity grower-investors. The behavior patterns of retailers and manufacturers tend to be short-run in orientation toward commodities which is inconsistent with the requirements of the grower portion of the subsector with their long-run specialized investments in orchards.

In a number of these aspects such as price fluctuations, price discovery, demand expansion and a long-run supply-demand balance, vertical coordination

could be improved by accurate and comprehensive market information. This information needs to be available and transmitted vertically within the subsector. That is, growers and processors need complete market information on demand conditions both in the short-run and long-run. Information on supplies also needs to be transmitted forward through the system.

Coordination in the Citrus Subsector

The U.S. citrus subsector is a multi-million dollar industry with production concentrated in Florida, California-Arizona, and Texas. Florida is the dominate producer of both oranges and grapefruit and provides most of the processed citrus products within the U.S. In contrast, most Texas and California fruits are sold fresh. This regional difference in product utilization is one of the major contributors to differences in structural arrangements and coordination within the subsector. Further, significant structural changes in the subsector can be directly associated with the development of processing technologies in the early 1950's.

Citrus is like many other tree fruits at the initial stage of production. Once harvested, the fruit can be sold fresh, remaining in a perishable form. Whereas, the same fruit can be transformed into a storable semi-perishable product through processing. This latter alternative provides the subsector with a number of marketing options not available to those products limited to marketing in a perishable form. In fact, much of Florida's coordination centers around its ability to manage supplies once in the processed state. Likewise, many of the unique structural arrangements can be related to the needs for inventory management.

As we view the operations of the citrus subsector, four major products produced from oranges and grapefruit are of major importance: fresh citrus, frozen concentrated orange juices (FCOJ), chilled orange juice (COJ) and canned

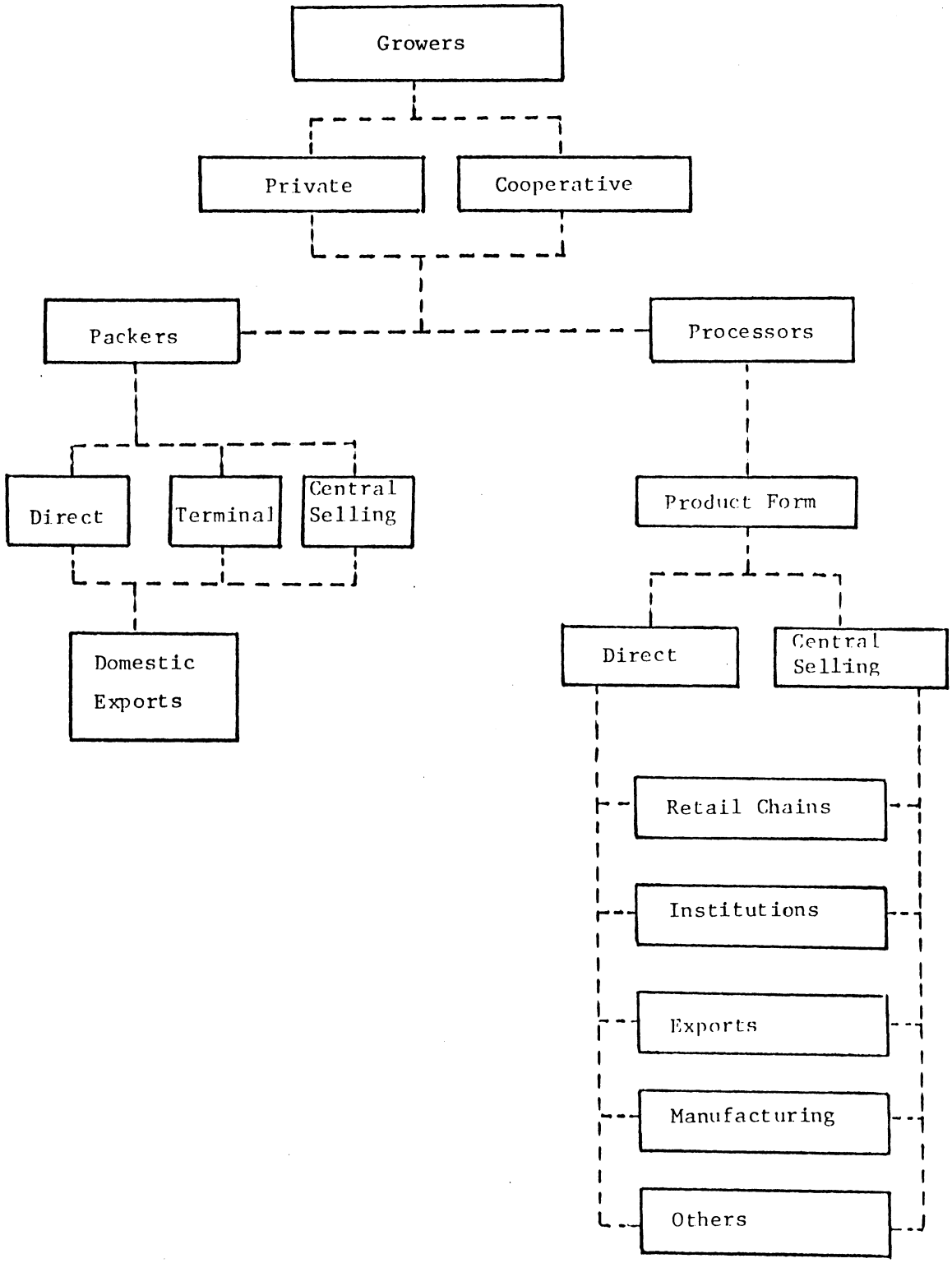
products (CSSOJ). Of these, those activities associated with the marketing of FCOJ lead to most of the coordination challenges and unique structural features found in the subsector. Figure 1 shows a general overview of the vertical linkages within the subsector. Note first that growers are coordinated with fresh fruit packers and processors through both cooperative arrangements and private firms. Within the California system the cooperative arrangement is predominate. Whereas, in all other producing regions both types of ownership arrangements play significant distribution functions.

The vertical linkage between citrus processors and retail, institutional, and export outlets differ by product form and a number of unique coordination arrangements have evolved to facilitate the flow of processed products. Many of the coordination problems and features of the subsector can be related to changes taking place among the final outlets for the processed products shown in Figure 1. We will consider these in the subsequent discussion.

Citrus is a seasonally produced commodity harvested from trees at least four or five years old. Considerable capital investment in groves are required prior to realizing any appreciable return. Concurrently, tree yields can fluctuate from season to season and groves are subject to freeze damage. These physiological characteristics of the trees lead to considerable production risk and, hence, uncertainty for the growers. Seasonal supply variability leads to high price risk to the citrus producer. In fact, over the last decade, the variability of prices to growers have been nearly twice that of the processing and retail sectors. Much of this difference can be directly related to the current coordination features between growers and processors.

The quality and juice content of citrus differs considerably between California and Florida. California citrus is better used for fresh while Florida's high juice yielding fruit is better for processing. Hence, coordination features differ as a result of these fruit characteristics. In particular, Florida growers

Figure 1. The Citrus Subsector -- Vertical Linkages



have more options for conversion of fruits into semi-storable products through processing.

The citrus growing sector is highly atomistic with very few extremely large producers. There is some backward integration from the packer and processor, but generally such integration is too small for any one firm to be totally supplying all of its own fruit needs. These growers must coordinate with packers and processors and the processors, in particular, have gained market power. Florida processors can be considered oligopolistic with a few very powerful firms providing significant price leadership to the industry. The distribution of market shares and the dominance of the top four firms has remained relatively stable since the mid-sixties. Many of the coordination features as well as general industry economic policies can be related to the positions of these large processors. Problems with this unequal distribution of power has led to industry proposals designed to place many of the coordinating functions, now controlled by processors, in the hands of growers. Growth of cooperatives and efforts to vest more power in the Florida Department of Citrus would be good examples of alternatives to large processors' impact on policies relating to inventory control, pricing, advertising, forward contracting, exporting, etc.

Recent growth of large retail chains have led to increased buyer power among a few national chains. These chains control most of the retail food distribution shelf space and are among the major volume buyers of citrus. Hence, they are in a position for exerting buying pressure when dealing with packers and processors. Currently over 75 percent of Florida's concentrate is sold under private retail chain labels while the remaining is under processor brands.

In addition to large retail chains, both the institutional (away-from-home) markets and the export markets have greatly expanded. In particular, development of efficient and effective means for supplying schools have been exceptionally

difficult. Likewise, methods for pricing products to many of these secondary markets has been both controversial and challenging. Providing a consistent supply of product to secondary markets during periods of rising prices has been a major problem.

A large share of processed citrus is initially produced in a bulk concentrate form and then later reprocessed into the major processed citrus packs. Maintaining an optimal storage quantity of bulk concentrate is the major coordinating task among processors. Inadequate inventories, excesses, or changes in the relative distribution of inventories among processors often create pronounced price adjustments and promotional allowances. Inventories generally provide a direct barometer of the forthcoming pricing policies. Adjustments in concentrate prices in order to correct for abnormal inventories are currently made by processors. These adjustments in turn have an impact on returns to the entire subsector. Often what appears optimal for the oligopolistic processor may not be optimal for the subsector, yet such policies often result from processor decisions. While inventory management skills are highly developed, the coordination of inventories consistent with the total subsector welfare continues to be a significant task.

Product allocation from bulk or raw fruit to the three major processed products is readily accomplished with a high degree of flexibility. Generally, both historical allocations and current prices will dictate the flow of product to the alternative uses.

The citrus subsector is somewhat unique among agricultural industries in that the industry trade associations are the most important sources of information on product utilization and distribution. Information flows freely throughout the subsector and is usually timely and in-depth. The subsector has excelled with its efforts to inform consumers of the benefits of consuming citrus. Advertising programs are highly developed and generic advertising is controlled by industry

organizations rather than individual firms. Also, there is considerable competitive advertising among the major producing regions.

Currently the most important task with the coordination of information relates to the economic role of branded versus generic advertising. Recently, efforts to change the advertising mix have occurred where a portion of grower taxes are used to promote brands in addition to generic advertising. It is not yet clear whether this attempt to coordinate the advertising mix will change the competitive nature among processors, expand demand, create advertising inefficiencies, etc.

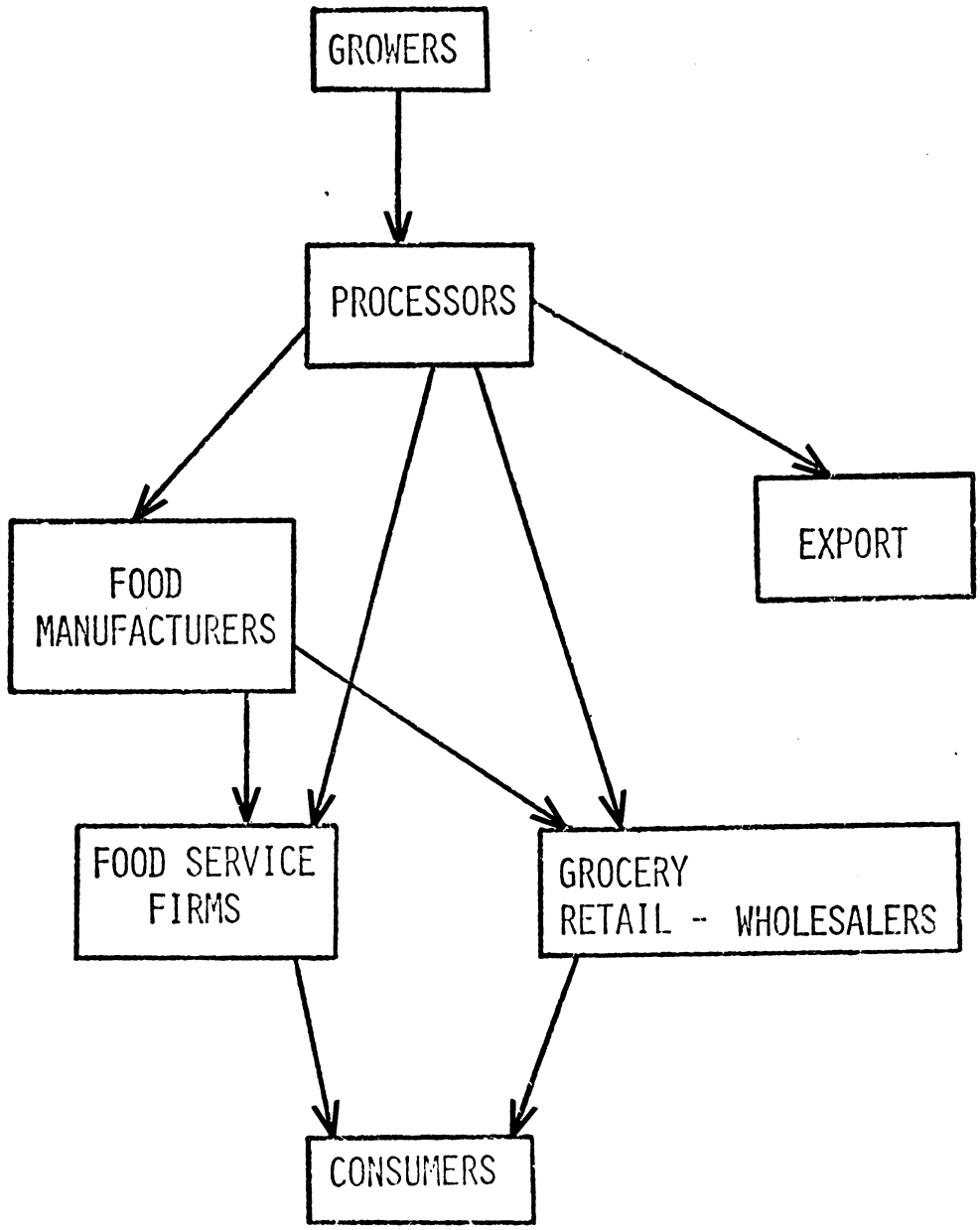
Coordination in the Tart Cherry Subsector

The main participant groups in the tart cherry subsector include growers, processors, food manufacturers, grocery retailer-wholesalers, food service retailers and wholesalers, and consumers. Although retailers, wholesalers and consumers would not consider themselves as part of a "cherry subsector," they are very important participant groups for the commodity-oriented grower and processor portions of the subsector. The vertical linkages of the major participant groups are shown in a generalized scheme in Figure 2.

Tart cherry growers market essentially the entire crop for processing. Processors include freezers, canners and pie filling manufacturers all of whom buy in the same raw-product market, but sell their processed products in somewhat distinct markets. An increasing percentage of processing is being done by cooperatives and by grower-owned, on-farm plants in which the grower processes mainly his own production. Thus the linkage between growers and processors is experiencing increasing vertical integration.

Frozen cherries are the most important market for processors -- representing about 65 percent of the cherry pack. Frozen cherries are sold by processors primarily to food manufacturing firms to be used as an ingredient for consumer

FIGURE 2. THE TART CHERRY SUBSECTOR -- VERTICAL LINKAGES



products such as frozen pies and prepared desserts. Frozen cherries are also purchased by bakery and food service firms and by pie filling manufacturers. Sales in the frozen cherry market are made primarily by individual negotiation between processor-sellers and manufacturer-buyers. Since frozen cherries provide the main market for processed cherries, it is often used as the "barometer" market for pricing related to other levels in the subsector such as the raw cherry market.

Consumer size pie filling and canned cherries are sold by canner-processors to grocery chains and wholesale organizations. The linkage and behavior patterns of this portion of the cherry subsector are similar to those for FCOJ and for canned vegetables which are well described in the paper by Campbell and Hamm.[1] Canned cherries are sold predominately as a private label product with some weak packer labels. Pie filling is sold under a few packer brands with some recent increase in private label sales.

Food manufacturers of frozen pies and prepared desserts market their branded products through retail grocery chains and wholesale organizations. Most of these food manufacturers are divisions of some of the largest diversified food firms or conglomerate firms in the country. Their behavior and vertical linkage at this point is not peculiar to tart cherries, but is very similar to the way manufacturing firms operate for other highly branded products sold through the grocery retailer-wholesalers.

Although the behavior of branded food manufacturers is not peculiar for cherries, their actions and effective linkages with grocery retailer-wholesalers are very important for a commodity like tart cherries. This is especially so since a high percentage of tart cherries are sold to consumers in the products of food manufacturers. Of perhaps greatest importance for other farm commodities

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[1] "Vertical Organization and Coordination in Processed Peas, Sweet Corn, and Snap Beans" by Gerald R. Campbell and Larry G. Hamm, Blacksburg, Virginia, Aug. 6, 1978.

is the fact that cherries provide a case-study example of behavior and linkages with large food manufacturers. The role and behavior of food manufacturers will likely become increasingly important for many other agricultural commodities because of their effective position with advertising and with their linkage through retail grocery firms.

Canned cherries in institutional sizes are now sold heavily into export markets, although some are marketed domestically to the bakery and institutional trade. The export market relies in its vertical linkage upon two or three layers of export brokers, import brokers and importers in the receiving country. These layers exist, in part, because of the special informational and trade regulation considerations in the international markets. By contrast, in domestic markets many brokers and wholesalers in the vertical linkages have been bypassed. Examples of this "streamlined" vertical channel are provided by the canned or frozen cherry sales which are done primarily by individual negotiation directly from processor to grocery chain or to large food manufacturer.

There are about 4,000 tart cherry growers in the nation. Grower numbers are experiencing a significant decreasing trend. An increasing proportion of the production is concentrated in the hands of the larger 25 percent of the growers. Almost all of the growers, including the largest farms, are owner-operators. The trend to fewer and larger cherry growers is occurring because of (a) economies of size related to mechanical harvesting, and (b) potential benefits from vertical integration into processing to reduce certain risks and to most fully exploit potential economies from mechanical harvesting.

Tart cherry growers could be described as atomistically competitive if there were no grower bargaining associations. Grower bargaining associations are, however, a significant feature in the tart cherry subsector. This adds a degree of oligopoly to the grower market behavior.

Freezer processors as sellers can be characterized as atomistically competitive. Although substantially fewer in number than cherry growers, with approximately 55 sellers of frozen cherries, each individual firm generally has very little market power. All firms essentially sell the same unbranded commodity of frozen cherries. Although some quality differences occur, these are not strongly identified with one processor or another (some freezers-sellers attempt to distinguish their product this way with limited success). It can be noted that in certain years, or in portions of the marketing season, there may be enough freezers-sellers who are sold-out so that the remaining firms with unsold inventory may be able to temporarily have a degree of oligopoly power. This, however, would be a fairly unusual situation with frozen cherry sellers.

As buyers of raw cherries some processors may have a degree of local oligopsony. This may be particularly evident in years of large crops. The impact of the local oligopsony feature has changed significantly with the increasing importance of processing cooperatives. Local oligopsony for raw cherries is a minor feature in the total situation of the tart cherry subsector. It is an interesting feature, in part, because many growers, particularly those interested in grower bargaining, perceive this oligopsony power of processors to be much greater than it now is. Processors did enjoy a greater degree of local oligopsony for raw cherries during earlier years until the distinct trend to grower-owned processing which has occurred in the 1970's.

On the buying side of the frozen cherry market apparently some oligopsony power is enjoyed by a few large manufacturing firms. Firms in this oligopsonistic core are large enough in their purchases to often be able to influence the frozen cherry market. In addition there are a greater number of firms which are smaller buyers of frozen tart cherries and which constitute a more competitive fringe for this market.

The specific behavior of food manufacturers as buyers of frozen cherries will depend in part upon their situation with their branded consumer products including product line decisions, continuity of grocery store shelf space, consumer product pricing, etc. Food manufacturers as sellers are generally strongly branded oligopolists. They are basically not commodity oriented as sellers. Cherries as an ingredient commodity must fit into the pie, dessert and other product lines of these branded food manufacturers or cherries will not be used by this important part of the vertical food system. This feature substantially affects behavior related to the market structure of food manufacturers both as buyers and as sellers.

Grocery chains and buying organizations have a substantial degree of buying power. This arises to a large degree from their "gatekeeper" position relative to shelf space and consumer access. Since most tart cherries marketed through grocery stores are sold by manufactures in pies, prepared desserts and pie fillings, these food manufacturing firms are the primary participants who deal with the market power position of chain stores and grocery buying organizations. Large manufacturing firms generally have substantial power and capabilities to effectively market their strong brands through grocery outlets. This is especially so in comparison to private-label processors of canned cherries (and other fruits and vegetables).

Special Coordinating Features for Citrus and Cherries

As suggested with the brief discussion of Figures 1 and 2, the major coordination features relate to the linkages between the grower and processor, processor and manufacturer, and the processor and the retail and institutional outlets. While a number of coordinating activities differ little from other similar subsectors, there are some specific arrangements while not necessarily unique but special to these two subsectors.

The citrus and cherry subsectors use a number of different arrangements for vertical coordination. These arrangements, or coordinating features, have arisen because of the special vertical coordination challenges of these commodity subsectors and the specific conditions affecting the subsectors.

A series of vertically linked markets and prices are a major element in the vertical coordination system for these subsectors, along with the operation of a number of proprietary food marketing firms such as processors and food manufacturers. In addition, there are a number of other specific institutions or arrangements which are used to affect the vertical coordination of these farm commodities. These include (a) processing cooperatives, (b) grower participation plans with processors, (c) grower bargaining cooperatives, (d) central sales organizations, (e) cooperative-corporations joint ventures, (f) marketing orders of various types, (g) trade associations, and (h) a futures market in citrus.

Storage and Volume Programs

One special coordinating feature aimed at stabilizing the fluctuating cherry supplies and prices is an industrywide storage program under a federal marketing order. Since typical price increases from large-crop years to small-crop years are substantially greater than storage costs, a storage program to stabilize supplies is economically feasible for this subsector. It is also designed to provide more dependable cherry supplies to manufacturers, retailers, and consumers.

The marketing order storage program is a new attempt to improve coordination. It has been used twice by the industry with some success. With more experience in the future, the industry will probably be able to use the storage program to even further stabilize supplies and prices for cherries.

The marketing order also includes a secondary provision that would permit nonharvest in large-crop years. The industry has used this provision to only a

very minor extent and probably will use it even less in the future because of favorable experience with the main storage provision. Use of the nonharvest provision in a major way would stabilize supplies somewhat by shortening large-crop supplies, but this approach would do nothing to increase short-crop supplies. If used in a consistent and major fashion, this provision would probably not be economically desirable for consumers and food manufacturers, nor in the long-run for the cherry growers and processors. It does provide some flexibility for unusual circumstances which have occurred only rarely in the past.

A program somewhat similar to the storage program for tart cherries has been proposed for Florida citrus. While processors including cooperatives currently manage all inventories of processed citrus at the wholesale level, there has been considerable effort to change the current structure. Since most Florida fruit is sold under a non-pricing arrangement through cooperatives or participation plans, the grower loses control over those inventory decisions affecting the returns for his fruit. As an alternative, a reserve pool concept has been proposed where a share of all fruit (after processing) would be placed in a grower-owned reserve pool. Product would be added to and released from the pool according to specific formula and the program would be administered by the Florida Department of Citrus. This program was initially proposed in order to provide an alternative product source to secondary and export markets when wholesale prices were extremely high. These markets would be assured of a continual flow of orange juice at subsidized prices when supplies were short. Of equal importance, however, is the fact that growers would gain some control over those storage decisions that influence the industry. As of this writing the industry-wide pool concept for citrus has not been adopted.

Federal market orders exist in each citrus producing region for both oranges and grapefruit. While these orders cannot directly control the available supplies

of citrus, they can regulate the variety, size, grade, and volume of shipments. Volume prorates may be implemented to coordinate the flow of fresh fruits into the markets. Frequently, within the Florida districts actual fresh shipments fall short of the prorate set for specific week(s). More importantly, however, strong control of quality and size has led to considerable improvement in the standards of fresh citrus reaching the markets.

Federal market orders in California-Arizona are defined for Navel and Valencia oranges. These orders are used in the same way as outlined above, i.e., grade and size limitations and rate-of-flow programs.

Market orders also facilitate quantity controls in the forms of market allocations and reserve poolings. A number of proposals for developing reserve pools for Florida frozen concentrate have been considered but currently all storage is still under the direct control of processors rather than that of producers using a market order. This is somewhat in contrast to the cherry subsector with its grower-owned market order storage pool.

Grower Pooling Arrangements

Coordination between citrus producers and first handlers are accomplished with both priced and non-priced arrangements. California producers sell most of their fruit through one large cooperative organization and, hence, share in the returns under the cooperative pooling system. Similarly, many private citrus processors and packers offer participation plans where growers pool their fruit in a manner not greatly different from that of cooperatives. These plans are contractual commitments to deliver all or part of a grower's supply with the price not being determined until after the product has been sold and the fruit pool closed. Processors make most major marketing decisions that influence pool returns but growers involved in the pooling bear nearly all price risk. One significant advantage for the growers is that they share in the average pooled price rather than facing higher price risk from spot transactions.

For the total subsector, cooperatives and participation plans account for over 80 percent of all citrus grown in the U.S. subsector. In contrast to that of tart cherry growers, citrus growers have limited bargaining power other than that resulting from that cooperative position The participation plans, while assuring the growers an outlet for their fruit, does not increase the bargaining position of growers.

Grower Bargaining

Bargaining has been used in the tart cherry subsector as an important co-ordinating feature with emphasis on raw-product pricing. Grower bargaining increased in importance primarily during the 1950s and 1960s when processing was predominantly by proprietary firms which usually paid a definite cash price to growers at harvest time. Bargaining was undertaken, in part, to: (a) aid in the price discovery process, (b) reduce risk to an individual processor that a competitor would be able to buy cherries more cheaply, and (3) to alter the market power situation in favor of the growers.

High risks in cherry marketing, along with strategies of other participants to shift the risk bearing function heavily to the growers, contributed to the development of grower bargaining. Grocery retailer-wholesalers were able to shift, most price and inventory risks to processors.[1] Food manufacturers were able to shift some risks to processors (although to a lesser extent than did grocery firms). Processors facing high risks shifted some risks to growers through (1) widespread "discounting" of the grower raw-product prices to allow for risks, (2) some participation plans, or (3) some custom processing. Use of these strategies was most pronounced in large-crop years when risks to processors are highest. The result was that growers bore a substantial amount of the short-run market risks while they had very limited market information and little ability to make changes which might reduce the risks.

[1]Grocery retailer-wholesalers' behavior was considerable more important when bargaining associations were first formed because a substantial percentage of the tart cherries were retailed as canned cherries in that period.

Grower bargaining has been used in the tart cherry subsector to shift some risks back to the processors. Although processors are often perceived by the growers to have strong risk-bearing capabilities, most processors are small, family-owned, specialized firms which are not well suited for this.

Bargaining has provided cherry growers a degree of market-influencing ability. Bargaining associations have provided more complete market information, especially to growers, but also to processors and other participants. Through their use of market information, influence, and risk shifting ability, bargaining cooperatives have probably aided in the price discovery process and have strengthened the growers' market power position from that of merely a residual claimant.

The market power of cherry bargaining associations is somewhat limited by (a) the tonnage processed by cooperatives, (b) the tonnage of growers who are not association members and (c) the highly perishable nature of the crop. Since bargaining for cherries has been approached through an association of state bargaining cooperatives, there is an element of national bargaining oligopoly, but this is limited by the aforementioned factors. The degree of oligopoly power of the bargaining association is also not particularly great in years of large production since processor-buyers can essentially ignore the bargaining association when supplies are large. This would be much less likely to occur, and the bargaining associations' position would be stronger, if bargaining were to be done in the future under Michigan's bargaining legislation which permits exclusive agency bargaining and mandatory arbitration.

Grower bargaining is centered heavily in Michigan where 70 percent of the nation's tart cherry production is located. Although Michigan's unique bargaining legislation permits exclusive agency bargaining, and tart cherries would be a logical commodity for use of this bargaining approach, tart cherry bargaining

has not been done on exclusive agency basis. This is primarily due to a court case challenging the new bargaining law. If bargaining for tart cherries were to be done on exclusive agency basis there would be a significant element of oligopoly in the market structure at this level. This oligopoly position would nevertheless be significantly limited by the factors that (a) the exclusive agency approach is presently limited to Michigan and (b) a substantial percentage of the cherry tonnage is now handled by processing cooperatives which are potentially exempt from Michigan's bargaining law.

Grower bargaining for tart cherries has probably been moderately successful from the point of view of growers. Because of the situation in other parts of the cherry marketing system bargaining has probably had little significant effect upon consumer prices.

In recent years the percentage of the cherries bought by proprietary processors has been decreasing while the percentage handled by cooperaties and on-farm grower processing has been increasing. Because of these trends the proportion of the crop which is directly affected by raw-product bargaining has been decreasing. Therefore this is becoming a "thinner" market.

Processing Cooperatives

Trends to more grower-owned processing, including cooperatives, have occurred in the tart cherry subsector because of: (1) the potential for close technical coordination of mechanical harvesting, cooling and processing, (2) reduced risk to the growers from insufficient processing capacity in large-crop years, (3) EPA, OSHA and other regulations which have forced some processors out of business, (4) high risks and low profits to processors which have resulted in unwillingness by some proprietary firms to reinvest in facilities, (5) the fear of some proprietary processors of operating under Michigan's bargaining legislation coupled with the processing cooperative exemption in that law, and (6) many large growers

being willing to make additional investments in processing facilities to protect their orchard investments. It is expected that these factors will continue to encourage the trend to an even higher percentage of the processing to be grower owned.

Although cherry growers who integrate into processing have an additional potential profit center, this forward integration also involves additional risks to the grower. There is no longer a specified, cash price for raw cherries to the growers using this approach. With weak or falling markets the growers will feel the disadvantage of carrying this risk, while strong markets will often provide growers favorable returns for bearing the additional market risks. Processing growers will also have increased risk from their investment in processing plant facilities.

With the increase in grower cooperatives and on-farm processing plants, there has been an increasing number of sellers of frozen cherries. Thus the freezer processors have become somewhat more atomistically competitive than a few years ago.

The increase in number of freezers-sellers has been held in check somewhat by the fact that some of the new firms have entered into centralized marketing arrangements. Some new firms have decided to market their cherries exclusively through an existing processor or broker. Some new grower-processors have formed a federated marketing cooperative. These and other coordination arrangements which center on the market for processed cherries, rather than on the raw cherry market as does bargaining, will likely become increasingly important in the future.

With the increasing percentage of the cherry tonnage handled by grower-owned processors and the possibility of increasingly strong bargaining under Michigan's new law, many of the remaining proprietary processors are concerned that they will be in a position of even greater risks in the future. They fear that they will be

pressured to pay a specified, cash price to growers at harvest time while they sell in competition with cooperatives which are not committed to a specified grower price. The cooperatives also usually delay full payment to growers until after the processed cherries are sold. This situation is especially risky to a proprietary processor when supplies are large. Because of their concerns about this situation a number of proprietary processors are threatening to (a) become a cooperative, (b) form a vertical corporation-cooperative joint venture, or (c) implement a participation plan such as in the Florida citrus industry.

Occasionally in the past some proprietary cherry processors have operated participation plans with growers, although this approach has been of minor importance in the cherry subsector. The widespread use of participation plans by proprietary processors of citrus has been a notable contrast to the tart cherry subsector.

Marketing Management

The coordinating linkage between citrus processors and retail outlets (Figure 1) is direct rather than through auctions. Two important coordinating mechanisms between the processor and buyer are that of central selling and non-price contracting with large chains. The central selling simply performs the marketing and pricing functions that were historically handled by each processor. Beyond those of pooling the marketing functions of a number of processors, the coordination with the central exchange differs little from that of processor selling direct.

A common practice among many processors is to establish verbal contracts with retail chains to purchase a fixed supply of private label citrus over a season. Processors then have some lead time for the labeling of cans to be shipped to the buyers. However, once the cans have been labeled with specific private labels, individual processors have actually reduced the number of potential buyers for that specific product. Since the product has been labeled but not priced to the buyer, this coordinating mechanism gives the buyer increased market power.

At the wholesale or fob market level, a coordinating mechanism often exists between buyers and sellers which allows wholesale buyers to purchase given amounts of a product following an announced fob price increase at the previous or lower price for a specified period of time. This procedure is referred to as a buy-in privilege or policy. The amount of product a wholesale buyer may purchase at the lower price depends on the buyer's recent purchase record. The more product a firm has recently purchased, the greater the amount of product that may be bought at the lower price.

Cooperative-Corporation Joint Ventures

Some joint ventures between a cooperative and a food marketing corporation have been used in the tart cherry industry. One large vertical joint venture has been operating in this subsector for several years. It is apparently viewed as successful by both grower-members and the food marketing company. At least two other joint ventures were tried in Michigan, but were unsuccessful and have been terminated. A number of existing proprietary processors have indicated that they are considering the use of a joint-venture approach to improve vertical coordination from their point of view.

The major cooperative-corporation joint venture for cherries provides the grower members advantages in regard to effective consumer access and demand expansion for cherry pie filling. Most grower-members in the cooperative sell only a portion of their cherry crop through the joint venture, and rely on other vertical coordinating mechanisms for the remainder of their crop. Cooperative members in this joint venture share in the profits from all food products of the company. This arrangement has provided in recent years some significant additional profit opportunities for cherry growers in this cooperative. Primarily because of the successful experience of this joint venture, it appears that vertical cooperative-corporation joint ventures may become somewhat more important in the

cherry industry in the future. Growth of joint ventures will probably be held in check somewhat by the experience with the unsuccessful joint ventures which were terminated.

Futures Market

A futures market is used by the citrus subsector. The tart cherry subsector, in contrast, does not have a futures market.

The frozen concentrated orange juice futures contract is a coordinating mechanism predominately used by Florida processors. It has little relevance for California and Texas as a hedging mechanism. The marketing structure of the citrus subsector dictates to a degree the usefulness of FCOJ futures. If an industry or a firm within an industry maintains complete control over prices, then the need for use of the futures market is questionable. Likewise, various structural arrangements such as strong vertically integrated links between producers and processors will alter the types of useful hedging programs. Programs to prevent unusual supply changes such as product reserves can reduce the probability of price changes and hence the need for hedging.

The Florida citrus industry is unique in that a futures market exists along with a market structure where strong price leadership prevails. Each trader in the industry anticipating hedging programs develops his hedging plans in accordance with his market position within the subsector. First considering the citrus grower, his hedging strategies will differ according to how he markets his fruit. If the grower is strictly a cash fruit operator, then he has in no way committed his fruit to be sold at a designated price. This trader is free to hedge his product. Although his fruit is uncommitted at the time of delivery, his options for futures delivery are not absolute since his product is still in raw fruit form. Generally, this grower must find a home for his fruit and lift his hedge through an offsetting contract purchase.

The structural arrangement of the citrus processors will usually better facilitate the use of hedging programs. Processors forward purchase a major share of their supplies through cooperative arrangements or participation plans. These supplies are carried as inventories and can be effectively hedged. However, the motivation for hedging may differ according to the particular processor structure.

Many citrus processors will hedge their non-pooled fruit (priced fruit) as it is carried throughout the season. The purchase price of this fruit is fixed; hence, it is the processor's equity which is subject to the price risk. In comparison, changes in the value of pooled fruit can be passed back to the grower with the full price risk being carried by the grower. There may be less economic motivation for the processor to hedge this fruit since the price risk can be passed on. If the processor is a cooperative, there should be an incentive for the cooperative board to protect all fruit since ultimately all returns to the cooperative are distributed back to the grower. In contrast, the economic incentive for hedging pooled fruit by corporate processors will depend upon how the gains from hedging are shared between the processor and grower.

Commodity Demand Expansion and Market Development

The Florida Department of Citrus (FDOC), as defined by the Florida Citrus Code under Florida Statutes, is a regulatory body responsible for setting and policing product standards, to support citrus research, and to develop broad generic marketing programs for Florida Citrus. The department taxes growers directly and all revenues must be used for those programs authorized by the Citrus Code. While the department is not directly involved in sales, they maintain a field staff of over 100 fieldmen throughout the U.S. who have the responsibility of working directly with retail and institutional outlets to promote Florida sales. Similarly, the department supports one of the largest generic advertising programs among agricultural subsectors. This includes national TV

advertising, radio, newspaper and magazine advertising, in-store displays and substantial consumer coupon activities. These programs represent a unique co-ordinating mechanism among subsectors.

The citrus subsector is expected to continue a strong advertising program. Competitive advertising between producing regions will most likely increase. More recently, efforts to change the advertising mix have occurred where a portion of grower taxes are used to promote brands in addition to generic advertising. Historically, grower citrus taxes have been marked for generic promotion only. Recent state legislation now allows a maximum fixed percentage of these funds to be used for branded advertising programs. This new policy arises partially from the belief that generic efforts may be reaching a saturation point and that generic and branded advertising are complementary. Also, these additional funds may create greater competition among processors and may strengthen the processor brands versus private labels. If brands are strengthened, then the market power of retail buyers could be reduced somewhat.

The other side of this issue is the possibility that processors may not increase their promotion. Rather they may simply substitute public for private advertising funds. Experiences by the Florida industry in its programs of joint advertising ventures with retail chains suggest that retail chains did in fact substitute Florida generic funds to maintain their on-going newspaper advertising programs. Whether or not the same will hold for processors using public funds has yet to be tested.

Secondly, generic funds diverted to brand advertising could stimulate small and inexperienced firms to develop advertising programs. If economies of scale for advertising exist, then considerable waste may occur when many smaller firms apply for generic funds.

Irrespective of the final impact of various advertising mixes, the subsector will most likely include a number of innovative and yet to be tested

advertising and promotional efforts. These programs will also apply to the international markets through three-party programs.

The federal government participates in the foreign market development of orange juice with support of brand promotion activities of distributors in European markets. A Three-Party Program is a direct method for the government to participate in coordinating market development where the Florida Department of Citrus, the Foreign Agricultural Service of the USDA, and the European distributor share the cost of promotional activities in Europe. Also federal tariff and duty drawback programs facilitate foreign market development by providing a mechanism for coordinating the imports and exports of citrus concentrate by placing a direct tariff on all orange juice imports with the option for the firm of regaining the tariff once exports are made.

Demand expansion for tart cherries is undertaken on an industry-wide basis supported financially by the growers. Funds for the demand-expansion program are collected from growers through the use of state marketing orders in Michigan, New York, Wisconsin, and Pennsylvania.

Some of the demand-expansion work is done through state promotional organizations. Most of the demand-expansion efforts, however, are done through a national organization (The National Red Cherry Institute) to which funds are contributed from each state marketing order.

The cherry subsector has a much smaller budget for generic demand expansion than does citrus. Funds for the cherry generic program amount to only about one percent of the generic demand-expansion budget for citrus. For this reason the mix of activities undertaken with the cherry program is by necessity considerably different from the citrus program.

Because a high percentage of tart cherries are sold as an ingredient for manufacturers of branded food products, much of the cherry demand-expansion

efforts are aimed at the product-line and merchandising decisions of food manufacturers and at menu decisions of food service and institutional establishments. The demand-expansion efforts also involve attempts to stimulate development of new manufactured products using cherries, to determine obstacles to expanded use of cherries and to work with food companies to overcome those obstacles for an expanding demand.

Trade Associations

There are no organizations of significance that directly represent a bargaining agent for citrus producers, except for that role provided by the cooperative organizations. Trade associations, while not involved in bargaining, are an extremely important structure within the citrus subsector. Most Florida producers are members of Florida Citrus Mutual, a producer trade association. This is a powerful organization providing leadership in all phases of the citrus industry. While this organization does not buy or sell products, it does provide market information to growers and reflects the grower point of view in all policies having an impact on Florida citrus.

The Florida Canner Association is a strong trade association and often works jointly to solve major citrus industry regulatory and marketing problems. Usually, the Florida Department of Citrus provides the mode or clearinghouse for addressing the various issues and coordinating the input from various citrus trade associations.

Trade associations are less powerful in the other citrus producing states primarily because Texas packers and processors are much more independent while California is dominated by one large cooperative.

In general, trade associations are an integral part of the citrus subsector and they provide significant coordinating functions, especially through their various informational publications. Their role in the political arena is

unquestionably essential as the citrus subsector continues to expand its world markets and face new competitors.

In the tart cherry subsector, the state and the national promotional organizations and the grower bargaining associations function as trade associations in regard to legislative matters and industry representation on important issues for the subsector (especially the growers). Since the instability of supply and prices has been a major obstacle to long-run demand expansion for cherries, the promotional organizations and the bargaining associations have been active in developing new industry-wide institutions such as the federal marketing order storage program to reduce this major industry problem. There are several state and national trade associations of fruit and vegetable processors which represent the interest of cherry processors on key issues.

Summary

Vertical coordination in the citrus industry involves a prominent role for processing cooperatives and participation plans, a large industry demand-expansion program and direct negotiation selling of private label products by processors to grocery retailer-wholesalers. In contrast to citrus, tart cherry coordination features have involved a substantial role for grower bargaining, an industry-wide storage program, and emphasis on commodity sales by processors to food manufacturers.

Although processing cooperatives have historically been relatively minor for tart cherries, cooperatives in that subsector are now exhibiting a definite growth trend. Thus in respect to cooperatives, the cherry subsector is moving to a pattern more like that for citrus.

The citrus subsector is noted for its large and successful demand-expansion program. Broad-based financing and a substantial volume industry enable citrus to have a large budget for demand expansion which includes several program

aspects such as national TV advertising, other media advertising, consumer coupons, in-store displays and trade fieldmen. Efforts to develop foreign markets for both fresh and processed citrus have taken on growing importance in recent years. The cherry subsector also has a generic demand-expansion program, but with a much smaller budget. Thus the cherry demand-expansion program by necessity involves a substantially different mix of activities and has a smaller impact on industry coordination.

The wide fluctuations in annual supplies and prices for cherries have an important impact on many aspects of vertical coordination in that subsector. These wide fluctuations, and the accompanying risks, are more pronounced and all-pervading for the tart cherry subsector than for citrus. The cherry storage program is a relatively new industry institution designed to improve performance on this most basic coordination problem for the cherry subsector. Although citrus has a similar supply fluctuation problem, it occurs less frequently and is not so all-pervading as in the cherry subsector. Citrus relies on individual processor inventories and storage to stabilize market supplies.

The important role of grower bargaining for cherries in contrast to essentially no grower bargaining with citrus raises a question regarding why this difference has evolved in the two subsectors. A notable difference in farm ownership pattern between the two subsectors seems to be one relevant factor. A large share of citrus groves are owned as a capital investment by absentee owners with primary income from other sources, while almost all tart cherries are produced by owner-operators for whom cherries provide a major source, or the only source, of their family income. A great instability in cherry growers' net returns plus the high grower risks for this crop also have led cherry growers to be interested in bargaining to provide greater stability and reduced risks with somewhat higher grower prices. Net returns on investment by citrus

growers have apparently averaged higher than for cherry growers. This net return difference appears to be another factor which is related to the stronger interest in bargaining by cherry growers than by citrus growers.

With the increase in cherry processing cooperatives and on-farm processing, the role of raw product bargaining for the tart cherry subsector will probably be less significant in the future than in the past. Bargaining will, however, likely remain a significant feature with cherries, in contrast to the citrus subsector.

Despite the differences in coordination of the citrus and tart cherry subsectors, trends indicate that the two subsectors will likely become somewhat more similar in the future in regard to certain key coordinating features. Processing cooperatives, participation plans and joint ventures are likely to become more important in the cherry subsector, increasing the similarity to citrus. Effective coordination for the processed commodity thus is very important for both citrus and cherries, since much of the raw fruit is moved from grower to processor under non-price arrangements. The citrus subsector may develop and implement a grower administered storage program similar to that for cherries. Thus several changes in the two subsectors indicate somewhat more similarities for future vertical coordination. Notable differences in coordination are likely to remain as well because of inherent differences in the basic nature of the two subsectors.