Market Analysis: Price and Consumption Trends

While consumer demand for greenhouse tomatoes was growing in recent years, it was sometimes outpaced by even more rapid growth in supply. This led to two periods of very low prices, first for beefsteak tomatoes in the late 1990s and then for TOVs, in the summer of 2004. As the greenhouse industry has grown, there has been more interaction between greenhouse and field tomato prices.

Data limitations pose a challenge for analysis of prices (see appendix 4, "Data on Greenhouse Prices in the U.S. Market"). Utilizing the limited available data on prices of Canadian and Mexican greenhouse tomato imports, as well as data on U.S. wholesale market prices, provides a partial picture of price trends.

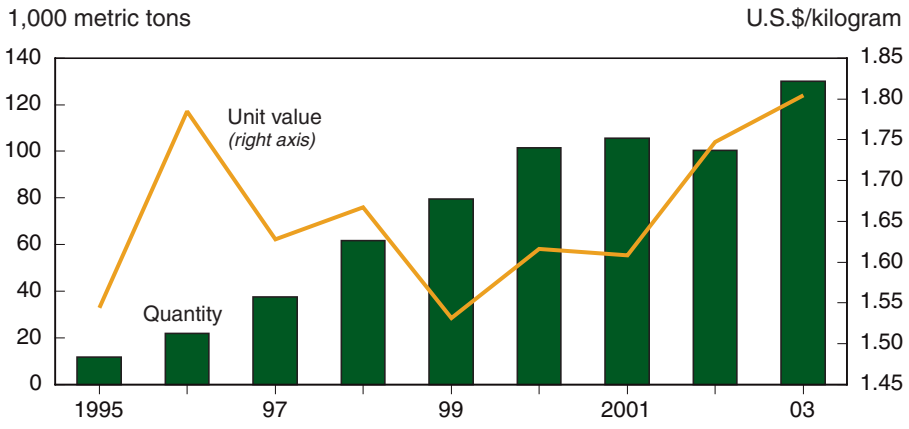
Impact of Rapid Production Growth on Prices

In 1999, the unit value of imported Canadian greenhouse tomatoes, mainly beefsteak tomatoes at that time, hit a low of U.S. $1.53 per kg (fig. 11). The U.S. fresh tomato industry was particularly concerned in the summer of 1999, when Canadian greenhouse tomatoes were reportedly sold in California at prices lower than field tomato prices (*The Produce News*, 1999). Prices increased in 2000, in part because total U.S. greenhouse supply increased very little in 2000 [U.S. production dipped although imports continued to climb (see table 9)], allowing consumer demand to catch up with supplies. After 2000, Canadian import data provide less information on prices for beefsteak tomatoes. Trade data aggregate beefsteak, TOV, and specialty tomatoes into a generic greenhouse category and the higher Canadian import prices after 2000 partly reflect the changing product mix over time.

Data on Mexican import prices provide more recent information on beefsteak prices. USDA's Agricultural Marketing Service (AMS) started

Figure 11

U.S. imports of greenhouse tomatoes from Canada, in quantity and value



Source: U.S. Department of Commerce.

collecting data on Mexican beefsteak tomatoes entering through Arizona in 1999. Since then, the highest 4-month average price for Mexican beefsteak tomatoes was in 2000, up substantially over the low 1999 average, verifying the trend seen in the Canadian import data for 2000 (fig. 12). The rapid shift of growers in the United States and Canada to TOV production reduced market pressure on beefsteak tomato prices. From 2000 to 2004, there was no clear trend in winter prices of imported beefsteak tomatoes in the Nogales market. Since winter supply was still relatively low, Mexico had been able to maintain fairly stable winter beefsteak prices in the face of overall increases in greenhouse production. However, expanding supplies in winter 2005 caused prices for Mexican beefsteak tomatoes to fall to an all-time January low. The industry reports that summer beefsteak tomato prices have increased somewhat in the last 2 years due to declining availability in the United States and Canada.

TOV growers report that their prices declined gradually with production increases until the summer of 2004, when prices fell dramatically due to a sudden production surge throughout North America. Wholesale market prices, the only information available for TOV prices over several years, did not appear reliable for judging trends.[20] AMS only began collecting FOB price data on Mexican TOVs in April 2004.

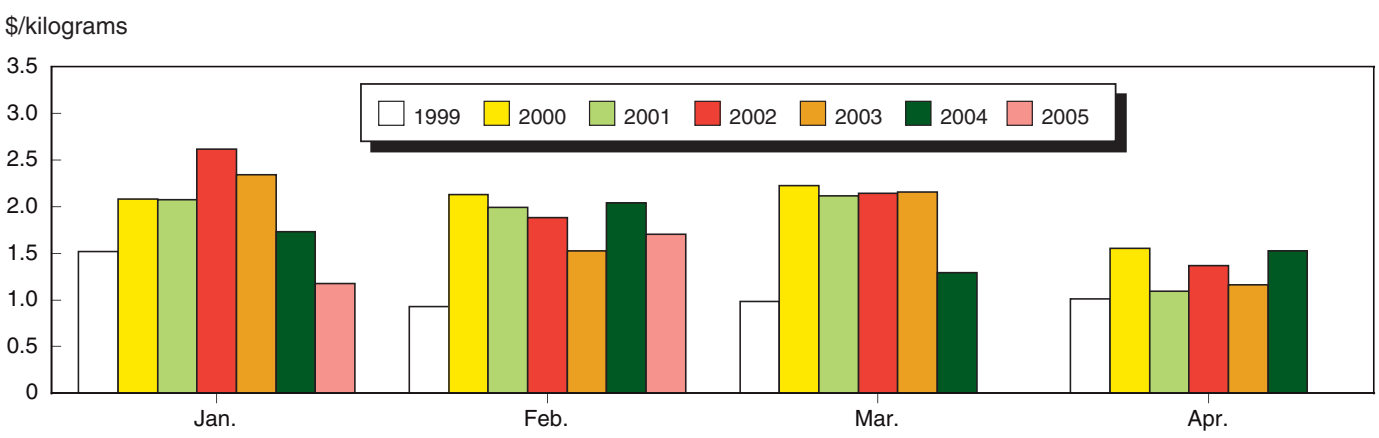
Greenhouse and Field Tomato Prices

Prices of fresh field tomatoes are volatile. Daily prices may vary due to transportation problems or adverse weather conditions in both supply and demand regions. Weather can shift the start or end date for any production region, relative to its typical season, and this can cause either excess supplies or shortages, and sometimes sizable swings in prices for certain types of tomatoes. For example, an unusually large gap between availability of vine ripe tomatoes from Sinaloa, Mexico, and the beginning of the vine ripe season in California and Baja California, Mexico, might cause buyers to drive up the price of available vine ripe tomatoes rather than switch to greenhouse or mature green tomatoes for a brief period. Supplies of greenhouse tomatoes are less prone to unexpected price swings than field tomatoes, but weather can still

[20] Analysis of Canadian TOV prices in the Boston wholesale market from 2001 to September 2004 shows a general price increase through 2003. Greenhouse producers discount this view of pricing trends. The publicly available wholesale spot market price data, which are available from AMS, may be less representative than in the past. Greenhouse shippers are sending less to wholesale markets as they focus on direct sales to retail buyers.

Figure 12

Mexican beefsteak greenhouse tomato FOB prices, Nogales, Arizona[1]



[1] Beefsteak FOB prices are for size 22.

Source: U.S. Department of Agriculture, Agricultural Marketing Service.

impact production and prices. For example, unexpectedly cold weather can slow production and unanticipated hot weather can speed up production. Field tomato prices can affect greenhouse tomato prices and vice versa.

While some buyers may switch from one tomato type to another depending on price, not all view different types as substitutes. As a result, prices for different types of tomatoes do not always follow the same trend. Among three types of buyers—final consumers at retail stores, buyers for the retail stores, and buyers for foodservice establishments—the consumer at the retail store may be the most flexible. The availability of many types of tomatoes in most retail stores would tend to increase the price elasticity of demand. If the price of one type of tomato increases, many consumers will substitute another less expensive type of tomato.[21] Some consumers may not even recognize all the distinctions between types of tomatoes.

[21] Efforts to estimate demand elasticities for field and greenhouse tomatoes have yielded inconsistent results with both negative and positive cross-price elasticities (Thompson, 2003).

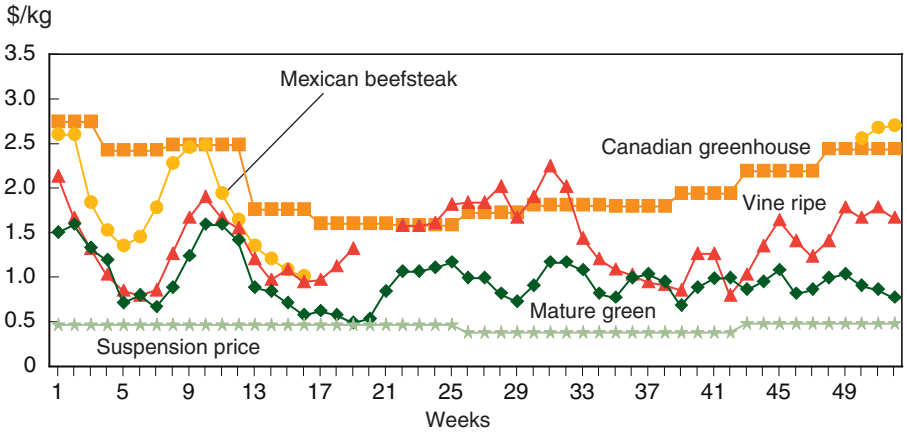
Consumer research highlights the difficulty in generalizing about consumer preferences for fresh tomatoes (*The Produce News*, 2004; Hughes, 2005). This research showed that Hispanic consumers strongly preferred field grown tomatoes. About one-third of non-Hispanic consumers strongly preferred field grown tomatoes, one-third preferred greenhouse, and one-third had no preference. Hispanic consumers were very knowledgeable about tomato types and selected across types based on specific intended uses (e.g., romas for salsas). In contrast, non-Hispanic consumers purchased more based on emotion, weighting appearance and ripeness at harvest as prime attributes. They were much more likely to substitute between types for the same intended use, depending on appearance and price. Hispanic consumers placed the most weight on price, partly contributing to their preference for field tomatoes, but the firmness and slicing characteristics of round field tomatoes were also valued.

Buyers for the retail stores may not be as flexible as many consumers. For example, a retailer that traditionally buys a very small amount of greenhouse tomatoes might not be able to acquire a larger quantity at short notice in the event of a scarcity of field tomatoes—particularly with forward contracting reportedly more common in the greenhouse sector. In periods of short supply, retailers often simply decrease shelf-space. Buyers for foodservice firms may be even less flexible. The foodservice industry consumes a large part of the mature green supply and in general does not substitute other tomato types that do not stand up to their very specific requirements, regardless of relative prices, making demand quite inelastic. Once an item is placed on a menu, foodservice operators are often willing to pay high prices to ensure its availability.

Data on prices of greenhouse tomatoes imported from Canada (monthly trade unit values) and Mexico (weekly FOB) provide an idea of the price range of greenhouse tomatoes in the U.S. market. In 2003, greenhouse tomatoes generally enjoyed a price premium over other types of tomatoes, but the premium varied throughout the year and during the summer there was one period when vine ripe prices topped greenhouse prices (fig. 13). The high greenhouse prices in the winter explain why growers try to acquire winter production in warmer U.S. or Mexican locations. Prices decline beginning in April as Canadian greenhouse production becomes available

Figure 13

Weekly fresh tomato FOB prices in the United States, by type, January-December 2003[1]



[1]California mature green tomato FOB prices are for 25-pound boxes of extra large size, with a grade of 85 percent U.S. 1 or better. Florida mature green tomato FOB prices are for 25-pound boxes of 5x6 size, with a grade of 85 percent U.S. 1 or better. California and Mexican vine ripe FOB tomato prices are for two-layer flats of 19 pounds of 4X5 size. Mexican greenhouse FOB prices are for beefsteak tomatoes in Nogales, Arizona, in a one-layer box of 15 pounds of size 22 tomatoes. Canadian greenhouse prices are a monthly unit value for imports of all greenhouse tomatoes, not a specific type or size. The suspension price is the minimum price program administered by the U.S. Department of Commerce; Mexican tomatoes cannot enter the United States at a price lower than the suspension price (Calvin and Barrios, 1998).

Sources: U.S. Department of Commerce; U.S. Department of Agriculture, Agricultural Marketing Service, Market News Service.

and remain low until November. Florida field production also increases in April adding to the supply of fresh tomatoes.

Mexican greenhouse beefsteak prices generally follow the broad trends in round field tomato prices although prices are usually higher. The Canadian greenhouse tomato price represents both lower priced beefsteak and higher priced TOV tomatoes so it should usually be higher than the Mexican beefsteak price. In March, Mexican prices equalled the monthly Canada price for 1 week, but if weekly data were available, Canadian prices might have still have been greater than Mexican prices. The Mexican industry is younger than the Canadian industry, and quality may still be less consistent as growers develop their ideal production systems. However, in December, as the new season began for many Mexican growers and the Canadian season wound down, Mexican prices exceeded Canadian prices.

Mature green tomatoes generally have the lowest FOB price of all those shown.[22] Vine ripe tomatoes usually sell at a price between those of mature green and greenhouse tomatoes, but in the summer of 2003, vine ripes were selling at a higher price than greenhouse tomatoes. Weather problems reduced the summer supply of vine ripe tomatoes in California, Baja California, and the east coast, all contributing to above-average vine ripe prices. This prompted some Baja greenhouse growers to remove the calyxes from their tomatoes and market them as field grown, vine ripe tomatoes.

Local wholesale market prices may not follow national FOB prices closely, but they do show prices for the range of products available in the market. In

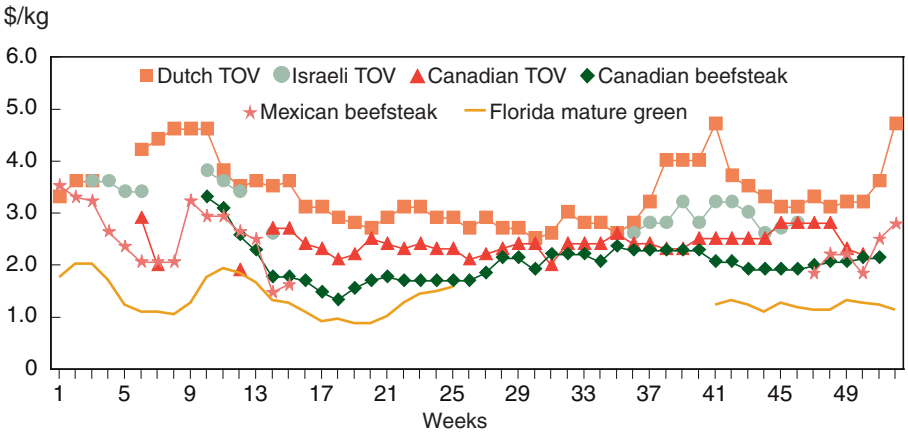
[22] Roma tomatoes, not shown, typically receive the lowest price of all tomato types.

the Boston wholesale market in 2003, Canadian TOV prices averaged 27 percent higher than Canadian beefsteak prices (fig. 14). Dutch greenhouse tomatoes are reputed to be of very good quality and are sold at a price premium over North American greenhouse tomatoes.

Figure 15 shows FOB prices in 2004 for major tomato types. As the greenhouse industry has grown from a niche to a commodity market, the interaction between greenhouse and field prices has become more marked. This is particularly true in 2004, which had very unusual pricing patterns. Because greenhouse production is still relatively small, compared with field tomato production, and is thought to face a more elastic demand, greenhouse tomato supplies should have much less effect on prices for field tomatoes than do field tomatoes on greenhouse. In fall 2004, mature green tomatoes were in short supply due to hurricanes in Florida and poor weather conditions in other growing regions. Buyers substituted vine ripe and greenhouse tomatoes for mature green tomatoes where possible. High mature green FOB prices pulled up beefsteak greenhouse prices from the very low summer 2004 levels. Beefsteak prices also followed mature green prices down in December. According to the industry, TOVs, which are not as obvious a substitute for large round tomatoes, also increased in price but not to the same degree as beefsteak tomatoes. Earlier in summer 2004, a record high supply of greenhouse tomatoes caused greenhouse prices to decline, reportedly making them even more attractive to retail buyers and placing a damper on demand for fresh field tomatoes. With greater supply has come an increased willingness on the part of consumers, retailers, and foodservice users to experiment with tomato types.

Figure 14

Weekly fresh tomato prices in the Boston wholesale market, by type, January-December 2003[1]

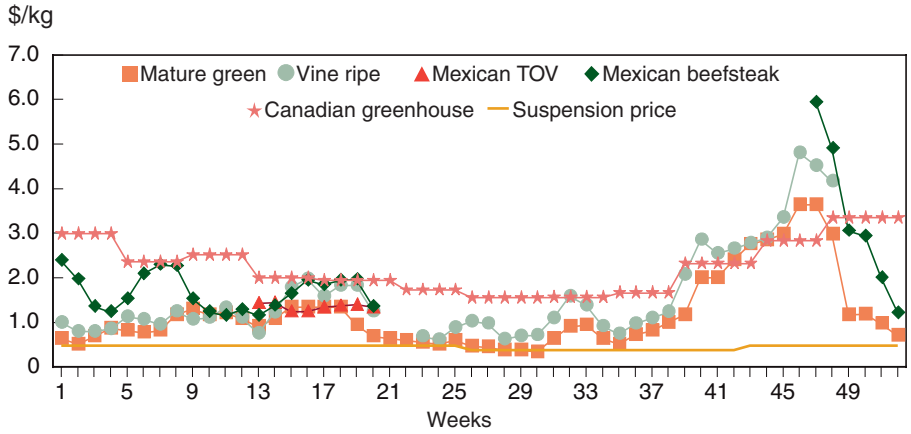


[1]Florida mature green tomato wholesale prices are for 25-pound boxes of 5x6 size, with a grade of 85 percent U.S. 1 or better. Mexican and Canadian beefsteak wholesale prices are for a one-layer box of 15 pounds of size 22 tomatoes (if Mexican 22's were not available, the closest available size was used). Dutch, Israeli, and Canadian TOV are all for 11-pound boxes of large (or medium if no large was available) tomatoes.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, Market News Service.

Figure 15

Weekly FOB prices for selected greenhouse and field tomatoes, January-December 2004[1]



[1]California mature green tomato FOB prices are for 25-pound boxes of extra large size, with a grade of 85 percent U.S. 1 or better. Florida mature green tomato FOB prices are for 25-pound boxes of 5x6 size, with a grade of 85 percent U.S. 1 or better. California and Mexican vine ripe FOB tomato prices are for two-layer flats of 19 pounds of 4X5 size. Mexican beefsteak FOB prices are for tomatoes in Nogales, Arizona, in a one-layer box of 15 pounds of size 25 tomatoes. Mexican FOB prices in Nogales for 15-pound boxes of large (or medium if no large was available) TOVs. Canadian greenhouse prices are a monthly unit value for imports of all greenhouse tomatoes, not a specific type or size. The suspension price is the minimum price program administered by the U.S. Department of Commerce; Mexican tomatoes cannot enter the United States at a price lower than the suspension price (Calvin and Barrios, 1998).

Sources: U.S. Department of Commerce; U.S. Department of Agriculture, Agricultural Marketing Service, Market News Service.

Consumption Analysis for Fresh Tomatoes

Annual U.S. per capita consumption of fresh tomatoes was an estimated 8.8 kg in 2003, a gain of 30 percent since 1985 (see table 9). Data used to calculate per capita consumption are not true consumption data from consumer surveys but rather disappearance data (production for the fresh market plus imports, minus exports equals disappearance—a proxy for consumption).[23] In 2003, U.S. per capita greenhouse tomato consumption was an estimated 17.2 percent of total fresh market tomato consumption—up from 10.6 percent in 1998. If we assume that the foodservice industry uses around half of all tomatoes and they are all field tomatoes, per capita greenhouse tomato consumption at retail would be over 30 percent.

More detail on trends in retail consumption of fresh tomatoes from 1999-2003 is provided by syndicated scanner data that measure actual weekly sales of products in selected retail stores across the United States in terms of quantity and value. Scanner data are difficult to use and should be considered only an estimation of actual retail consumption trends.[24] Retail trends in fresh tomato sales vary significantly when comparing the quantity (physical volume) sold versus dollar value. While the greenhouse share of quantity sold is increasing, the share of value sold is declining.

[23] The estimates presented here differ from ERS's per capita numbers, which only include U.S. production for tomato types with production reported by USDA's National Agricultural Statistics Service (NASS) (ERS, July 2004). The estimates by Cook and Calvin include U.S. greenhouse tomato production but still exclude domestic production of cherry and grape tomatoes, also unreported by NASS. Hence, these figures still somewhat underestimate total per capita consumption of fresh tomatoes.

[24] A few firms assemble scanner data from supermarkets and then sell the data to analysts. However, as large chain stores move in and out of the sample, some changes may be due more to the new sample configuration than to actual trends in sales. Some product look-up (PLU) or universal product codes are used in every store but some codes are specific to individual stores. We used a subset of codes that were consistent across each year. We excluded the rest of the data from the analysis presented here. The excluded share ranged from 9 to 5 percent of the total quantity sold. This category included some tomatoes that were difficult to pin down as either field or greenhouse, items with obscure codes, and items that were not consistent across years.

Quantity Trends

Total tomato quantity sold increased 6 percent between 1999 and 2003, while the field category (including round, roma, cherry and grape tomatoes) quantity sold declined 2 percent and greenhouse quantity sold increased 24 percent (fig. 16). According to scanner data, greenhouse tomatoes made up 37 percent of the weekly quantity of tomatoes sold in the average U.S. supermarket in 2003, fairly consistent with the earlier estimate of 30 percent based on disappearance data. While this is impressive considering that greenhouse tomatoes represented a negligible share of retail fresh tomato sales in the early 1990s, the greenhouse share was already 31 percent in 1999, indicating a gradual maturing of the category.

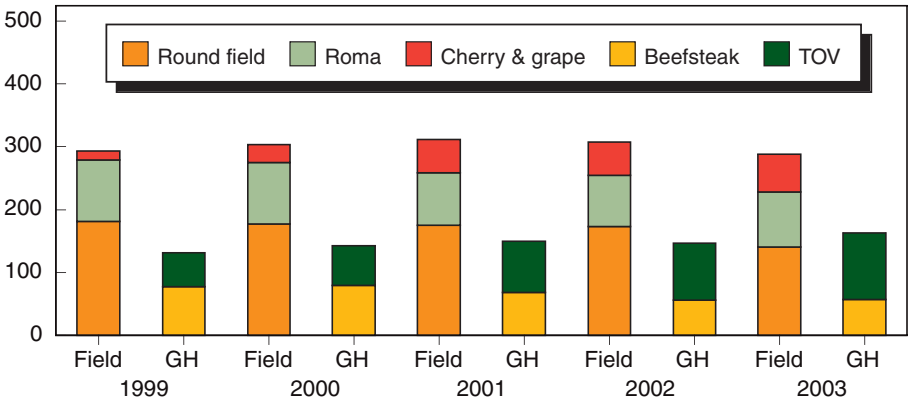
Since 1999, the more striking change has been the shifting product mix within the greenhouse tomato category, more so than growth in the quantity sold. In 1999, beefsteaks and TOVs accounted for 18- and 13-percent shares, respectively, of the average retail quantity sold of fresh tomatoes. In 2003, beefsteak tomatoes had an 13-percent share of the average quantity sold of all fresh tomatoes in retail stores. In the same year, the TOV share increased to 24 percent, replacing beefsteak as the greenhouse tomato of choice. The rapid growth in TOV quantity sold over this period appears to have come at the expense of beefsteak tomatoes rather than stimulating a major gain in the greenhouse tomato category.

Even though absolute volume had declined for the combined field tomato category, it still represented the majority of fresh tomatoes sold at retail in 2003. Round (mature green and vine ripe) and roma field tomatoes contributed 50 percent of the quantity sold in 2003—31 percent of all tomato volume was round field and 19 percent was roma tomatoes. However, the downward trend for these traditional field tomato leaders is readily apparent. The combined round and roma share of total retail fresh tomato quantity sold was 66 percent in 1999, 43 and 23 percent, respectively, for round and roma tomatoes. However, field tomato growers intro-

Figure 16

Average weekly quantity of fresh tomatoes sold per retail store[1]

Kilograms



GH = Greenhouse.

[1]Only major product codes are included.

Sources: California Tomato Commission and The Perishables Group.

duced new products that slowed the decline in the overall field share. In 2003, cherry and grape tomatoes, which are primarily field grown, accounted for 13 percent of the total retail quantity of tomatoes sold, up 302 percent in physical volume since 1999. Clearly, dynamism in the fresh tomato category has not been limited to greenhouse tomatoes.

The declining round field tomato category, like the greenhouse category, has experienced major shifts in the composition of sales. Breaking round field tomatoes into mature green and vine ripe tomatoes shows a dramatic change in share within the round tomato subcategory. In 1999, mature green tomatoes made up approximately 78 percent of the retail quantity sold of round tomatoes, compared with 39 percent in 2003, with the quantity sold of vine ripe tomatoes benefiting.[25]

With the loss in retail market share, the Florida and California mature green industries are increasingly dependent on the foodservice sector, particularly the fast food industry, which prefers a firm slicing tomato—characteristics found in the mature green tomato. Greenhouse tomatoes, with their higher water content and generally higher prices, are not attractive to the fast food industry. Consumption of food, including tomatoes, in foodservice channels has been on the rise since 1960. The away-from-home share of food expenditures was 47 percent in 2003, up from 24 percent in 1960 (USDA, ERS, Food CPI Briefing Room, table 1). Furthermore, the fast food industry represented 38 percent of the sales of meals and snacks consumed away from home in 2003 (USDA, ERS, Food CPI Briefing Room, table 17).

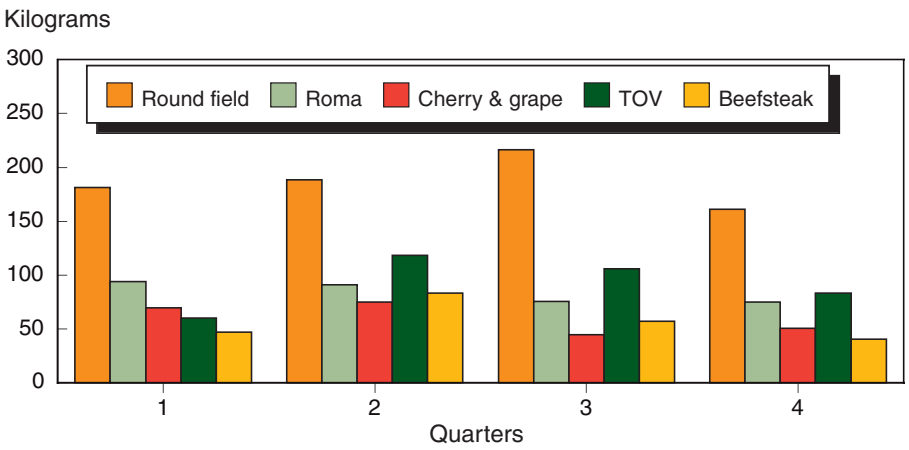
Although there has been a slowing in the growth of food eaten away-from-home, firms are interested in offering more health-conscious menu items, and tomatoes are being added to more menus. The composition of fast food meals is changing in favor of more produce and more high-value produce. McDonald's is among the top five foodservice buyers of grape tomatoes for use on some of its new salad offerings (*The New York Times*, 2005). While grape tomatoes are high priced, they hold up well in salads since they are not sliced. If greenhouse tomato growers were to develop a less juicy variety, such tomatoes might become more attractive to foodservice buyers, with the potential to be positioned as a premium product in some offerings. Still, the higher greenhouse price should work against any large-scale conversion. In the meantime, lack of demand from the foodservice sector, except for the very small upscale restaurant channel, will be a weakness of the greenhouse industry and the primary strength of fresh field tomatoes.

Sorting the retail scanner data by quarter and region adds depth to the picture of greenhouse tomato consumption. In 2002, quantity sold for both TOV and beefsteak greenhouse tomatoes peaked in the second quarter (fig. 17). While these trends follow well-known production patterns, consumer data allow quantification of the difference in supply between different seasons. Beefsteak tomatoes were at their lowest level in the fourth quarter, just 48 percent of the second quarter level for quantity sold. TOV sales were lowest during the first quarter, with volume only 51 percent of second quarter volume. During the winter, the total greenhouse tomato supply is limited mainly to production in the western and southwestern United States and Mexico, and as noted earlier, Mexico has a relatively low volume of TOV production. The first quarter of the year has the lowest physical sales

[25] It is difficult to separate out mature green and vine ripe tomatoes with scanner data. Repackers and retailers do not always distinguish between the two, which may be mixed together. This analysis relies on just three PLU codes that the industry thinks are the most representative of mature green and vine ripe tomatoes (3151, 4064, 4063).

Figure 17

Average weekly quantity of fresh tomatoes sold in retail stores, 2002[1]



[1]Only major product codes are included.

Sources: California Tomato Commission and The Perishables Group.

volume and highest prices for all greenhouse tomatoes. The field tomato (combining round, roma, and cherry/grape tomatoes) share of sales also peaks in the first quarter, with 76 percent of quantity of tomatoes sold in that quarter. The prices in the first quarter were 38 percent higher than the second quarter for TOV and 32 percent higher for beefsteak, reflecting the lower first quarter supply.

National analysis hides many regional variations in sales patterns. For example, in 2002, the beefsteak tomato share of quantity sold in different regions ranged from 3 percent to 25 percent. For TOV, shares ranged from 10 percent to 23 percent. Differences in regional consumption habits and the proximity of suppliers and the types of tomatoes they offer both play an important role in the seasonal and geographic differences.

Value Trends

While the quantity of all tomatoes increased 6 percent from 1999 to 2003 in the scanner data sample, the value of tomatoes sold increased 47 percent. Average prices increased for all tomato types except TOVs over this period (table 11).[26] When round, roma, and cherry/grape tomatoes are combined into a broad field grown tomato category, the field tomato share of retail tomato dollar sales actually increased from 58 percent in 1999 to 61 percent in 2003. The increase is largely due to the growth in the value of the cherry and grape category which increased 429 percent (fig. 18). While the greenhouse tomato value increased 44 percent, its share declined from 42 to 39 percent, because overall greenhouse growth in value was lower than for field tomatoes. This provides further indication that the greenhouse tomato category is maturing, and highlights the need for continuing product innovation to maintain consumer excitement and retail support. The changing product mix explains part of the increase in the total value of tomatoes sold between 1999 and 2003, with consumers showing a preference for higher value, specialty tomatoes. In 2003, the highest priced tomatoes were cherry and

[26] Growers frequently complain that pricing trends at the retail level do not follow FOB pricing trends. In this case, declining retail TOV prices are consistent with industry reports of declining FOB trends. However, beefsteak retail prices rose despite limited evidence suggesting no increase in FOB prices in the 2000-2003 period.

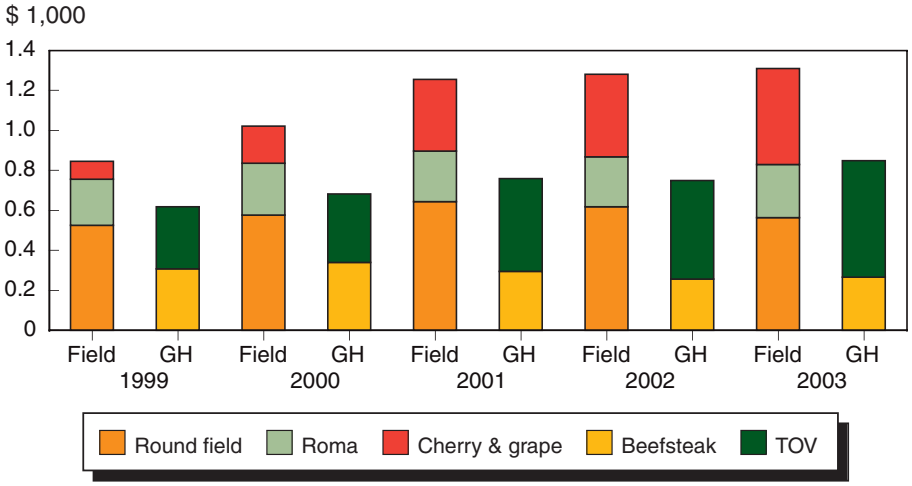
Table 11—U.S. average retail fresh tomato prices, by type

Type	1999	2000	2001	2002	2003
			Dollars per kilogram		
Round field	2.90	3.27	3.68	3.58	4.01
Roma	2.35	2.61	3.05	3.04	3.03
Cherry and grape	6.12	6.54	6.66	7.40	6.90
Beefsteak	3.99	4.30	4.35	4.59	4.73
TOV	5.70	5.42	5.72	5.43	5.47

Sources: California Tomato Commission and The Perishables Group.

Figure 18

Average weekly fresh tomato sales value per retail store[1]



GH = Greenhouse.
[1] Only major codes are included.
Sources: California Tomato Commission and The Perishables Group.

grape tomatoes, followed by TOV and beefsteak greenhouse tomatoes. Round and roma field tomatoes had the lowest prices.

Additional data from the Perishables Group put recent changes in the tomato category in perspective within the overall fresh produce department; from 2000/01 to 2002/03, tomatoes moved from third place to first in average U.S. produce departments in terms of sales. Industry analysts speculate that when greenhouse tomatoes were successfully introduced at substantially higher prices than field grown tomatoes, retailers saw that consumers were willing to pay higher prices than previously thought for tomatoes. This insight allegedly caused many to raise prices for field tomatoes, narrowing the gap between greenhouse and field tomato average prices. Many consumers appear to have felt that greenhouse and specialty tomatoes, such as grape tomatoes, represented a better value (price/quality relationship), and traded up in their tomato buying choices. In 1999, the average per kg retail price of a mature green field tomato was equivalent to 66 percent of the average price of a beefsteak tomato and 46 percent of the price of a TOV. By 2003, the price of a mature green field tomato represented 75 percent of the beefsteak tomato price, and 65 percent of the TOV price.