Economic Analysis of the Tart Cherry Federal Marketing Orders

By

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Introduction

In March 2008, the Tart Cherry Federal Marketing Order is scheduled for a referendum to authorize continuing operations. The purpose of this study is to examine and analyze historical data from the last 35 years (1972-2006) and to answer the following question: Is the tart cherry industry better off operating pursuant to the marketing order, as measured by the farm gate value of tart cherries at the grower level, than it would be operating without the Order?

The scope of the analysis looks at three distinct periods: 1972-1986, corresponding to the first Federal Marketing Order (FMO); 1987-1996, a period in which no marketing order was in operation; and 1997-2006, the years of operation of the second Federal Marketing Order. Various descriptive statistics (total value of production of tart cherries, value of production per bearing acre, and prices at the grower level) are collected and analyzed for the respective time periods. Econometric models are developed and tested to measure the impact of the two marketing orders on the value of production per bearing acre.

Previous Research

Putnam (1994) conducted a study of tart cherry profitability of New York growers that examined financial performance from 1972 (the first year of the first FMO) through 1993. The first FMO was in effect through 1986. Putnam noted that the years 1987-93 had been "disappointing for the New York tart cherry industry." Estimated collective losses for growers averaged $518,000 per year during this period, compared to an average of $1.3 million net returns in the prior six years during which the FMO was in effect. The New York industry lost money in six of the last seven years during the period from 1987 to 1993. In contrast, during the 15 years of the FMO (1972-1986),

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there were several years of exceptional profitability and only one year of losses (1986, the last year of the first FMO). Putnam noted that a new FMO with provisions similar to the earlier one, was unlikely to restore tart cherry profitability to the level of what it had been in the late 1970s and early 1980s. However, "having a tool to manage and moderate the impact of large crops continues to have economic and business merit to New York tart cherry growers." He concluded that a new order would modestly improve net returns, and would reduce the financial risk that growers would be "wiped out" by catastrophic losses in a large crop year.

In a Tart Cherry FMO hearing in 1995, Olan Forker testified on the potential impact of the proposed federal marketing order for tart cherries. Forker and Harry Kaiser, colleagues in the Department of Applied Economics and Management at Cornell University, developed a model of the operation of the Restricted Reserve Tonnage Program. In their model, grower price was hypothesized as a function of: the total pack for the year; stocks, or carry-in supply for the beginning of the year; net reserves (called the "policy variable"), or the volume of the product kept out of the market during the year; and a trend variable to account for other factors that might be correlated with price. An equation was also estimated for the impact on processor price. Both equations indicated that prices had moved downward over time (1972-1991) because of "a combination of other forces at work in the industry."

The authors used two scenarios, a Limited Reserve Policy and a Maximum Diversion Policy, to study the impacts of different policies for operation of the reserve pool. The authors concluded that operation of the **proposed FMO** would have modest impacts on price level and variability if operated conservatively; but with a more aggressive reserve policy, the price impact would be more positive and the impact on price variability would be more pronounced. It was noted that a more stable price over time would be to the advantage of the less efficient growers or those more heavily leveraged with respect to debt.

Kesecker compared and contrasted the marketing of three US fruit crops (blueberries, cranberries, and tart cherries). Cranberries, and especially blueberries, have higher sales for fresh utilization, at generally higher prices, than sales for processing. The history of generic promotion for the three crops was reviewed. All three crops have been determined by research to have high levels of antioxidants. In addition, there is growing evidence that tart cherries are effective in treatment of gout, osteoarthritis, and rheumatoid arthritis. Yet bearing acres of tart cherries had been on a declining trend, while acreage of blueberries and cranberries are growing. The farm value of production of blueberries and cranberries (since 1999) increased while the value for tart cherries in nominal terms has been rather static. Per capita consumption for tart cherries since 1992 has declined in comparison with static to increasing per capita consumption for blueberries and cranberries. (Static per capita consumption still implies growth in total demand at the rate of population increase.) These statistics in aggregate indicate a problem for the tart cherry industry, including the strong possibility of decreasing demand.

Industry Overview

We reviewed farm level statistics and trends for three periods of the last 35 years ending in 2006:

- 1972-1986, the years of operation of the first FMO, administered by the Cherry Administration Board (CAB);
- 1987-1996, a period in which no FMO was in operation, and
- 1997-2006, the years of operation of the current FMO, administered by the Cherry Industry Administrative Board (CIAB).

Some statistical highlights and comparisons of key economic indicators are shown below in Table 1.

Table 1. Tart Cherry Farm Level Prices, Value of Production, and Value of Production Per Acre, three periods, 1972-2006

Variable (units)	Time Period	Mean value
U.S. Price (processed, cents per pound)	1972-1986	26.2
	1987-1996	16.9
	1997-2006	24.5
Value of U.S. Production (million dollars)	1972-1986	51.1
	1987-1996	42.3
	1997-2006	55.1
Value of U. S. Production per acre (dollars)	1972-1986	1,222
	1987-1996	888
	1997-2006	1,450
Real U.S. Price (processed, cents per pound)*	1972-1986	40.5
	1987-1996	16.7
	1997-2006	21.4
Real Value of US Production (million dollars)*	1972-1986	79.3
	1987-1996	42.1
	1997-2006	47.8
Real Value of U.S. Production per acre (dollars)*	1972-1986	1,901
	1987-1996	882
	1997-2006	1,252

*Nominal prices adjusted by Prices Received by Farmers, Fruit and Nuts Index, 1990-92=100

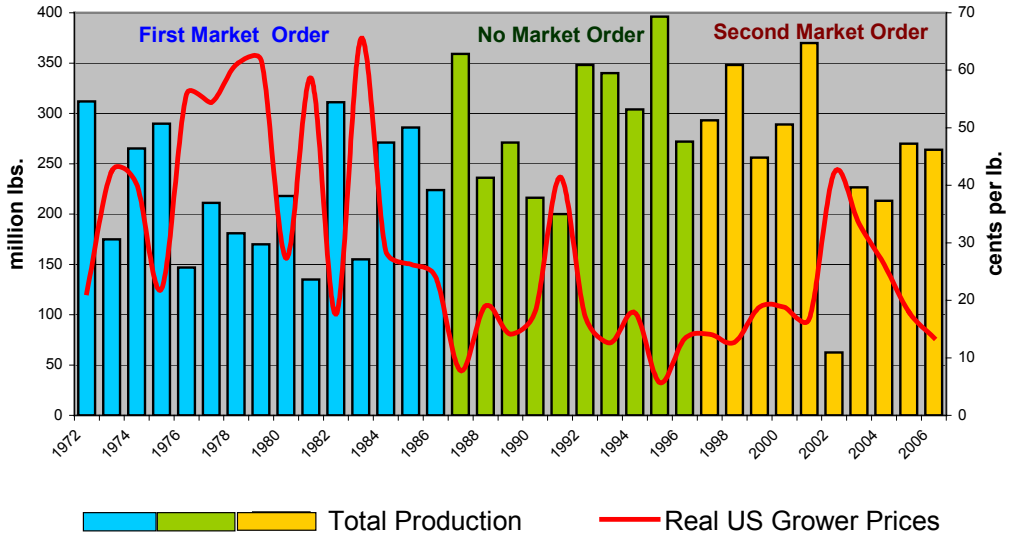
The statistics in Table 1 indicate that these key economic indicators during the first marketing order were higher for each variable than for the years 1987-1996 when the FMO was not in operation. Furthermore, when prices are converted to real value by the Prices Received by Farmers, Fruit and Nuts Index, the real values for price, value of production, and value of production per acre, are higher in the years of the second FMO than for the period when no FMO was in effect. Also, average nominal values of the three variables are higher for 1997 through 2006 period compared to the period of no marketing order. Real values for the three estimates are, however, lower in the 1997-2006 period than for the years of the first FMO.

Rationale for a Federal Market Order

The preceding statistics show that the results for the years in which the FMO was in operation were superior to the results when the FMO was not in operation. The statistics support and substantiate the results of previous studies by Putnam and Forker and Kaiser. These results are not sufficient, however, to assert that the FMO **caused** the improved economic performance; thus we concluded that a more rigorous analysis was needed. The next two sections of the report analyze the hypothesis that the tart cherry industry is better off operating pursuant to the FMO, as measured by the farm gate value of tart cherries at the grower level, than it would be operating without the Order.

The supply of tart cherries varies widely from year to year. According to Ricks, the magnitude of annual fluctuations is one of the most pronounced for any agricultural commodity (see Figure 1).

Figure 1. Tart Cherry Production and Real Grower Prices, U.S., 1972-2006



U.S. production reached a peak for the most recent 35 years of 396 million pounds in 1995. U.S. production in 2001 was 370.1 million pounds, the largest crop produced during the era of the second marketing order. A disastrous freeze in 2002 resulted in a national crop of just 62.5 million pounds, the smallest crop of the 35 years. Historically, Michigan accounts for more than 70 percent of U.S. production. This indicates the vulnerability of the crop to wide supply fluctuations—a crop that is very susceptible to spring freezes is geographically concentrated in one state.

A key relationship exists between the industry's bearing acres and production. On average, as the bearing acreage increases so will the production. The opposite will occur as the bearing acreage decreases. In Figure 1, the production levels from the mid- to late-1980s to the late-1990s were extremely high. During this same time frame, the industry's bearing acreage was also extremely high. Thus, the industry's production follows closely, with a small lag time of a few years, to the industry's bearing acreage cycle. There were 6,380 non-bearing acres of tart cherries in Michigan alone indicated in the 2006-07 NASS rotational survey (Kleweno). Considering that US bearing acreage in 2006 was about 36,000 acres (NASS), the Michigan non-bearing acreage indicates the possibility that production in the next year or two may enter another increasing cycle. As of 2004/2005, there were 6,740 acres in the US with trees aged 26 + years (Cherry Marketing Institute). These older orchards are candidates for removal due to missing trees and other factors contributing to reduced productivity. The extent of removals will depend mainly on product prices in the next few years.

From 1997 through 2007, the tart cherry industry has operated under a FMO. During this time the authorities the industry had under the FMO were the supply control features and generic promotion authority. The supply control elements allow for (1) the creation of a reserve pool, (2) the expansion of domestic sales opportunities by using restricted cherries in the market expansion, new product and new market program and (3) the sale of restricted cherries into other secondary markets such as exports. These aspects of the order have been used with varying emphasis by handlers in compliance with the supply control process. Use of the generic promotion authority commenced with the 2006 crop and will continue into the future.

While supplies vary dramatically from year to year, demand remains relatively stable. Demand for tart cherries at the farm level is derived from the demand for tart cherries and tart cherry products at retail and from the food service industry. The demand for tart cherries at the farm level is inelastic. Lower prices do not lead to large increases in the quantity demanded. The combination of inelastic demand and highly variable supply results in large price fluctuations at the farm level. In the last 35 years, nominal grower tart cherry prices (for cherries that are utilized for processing) have varied from 5.6 cents per pound in 1995 to 47.5 cents in 1979. Real grower tart cherry prices (for cherries that are utilized for processing) are shown in Figure 1. Figure 1 shows clearly the volatile nature of prices in response to large fluctuations in production. Real grower prices were as low as 5.7 cents in 1995 to as high as 65.5 cents in 1983. (Nominal prices were adjusted to real values by the Prices Received by Farmers, Fruit and Nuts Index, where 1990-92=100. This adjustment helps account for the effects of inflation as well as the performance of tart cherries with respect to other crops that could be considered as

alternatives to cherries, either for consumers or growers who can consider alternative crops.)

Even with a short crop in 2002, real grower prices were just 42.2 cents, and in the last five years have ranged between 13.5 cents to the 42.2 cents realized in 2002—well below the high real prices attained in the late '70s to early '80s. The lower prices are a continuing trend from that observed by Forker and Kaiser for the years 1974-1991 which were attributed to "a combination of other forces at work in the industry." Therefore, the rationale for continuing operation of the FMO should be based on the **prospect for raising real prices above what they would be without the order, not to raise real prices to the levels attained in the period 1972-1986 under the first FMO.**

To summarize, a major problem for the tart cherry industry is the large annual variation in supply along with the inelastic demand for the commodity. The variation in supply creates substantial coordination and marketing problems. To counter these problems, the main policy tool used by the Tart Cherry FMO is the use of volume controls. The FMO has the authority to use a reserve pool to control supply in the high production years. Since tart cherries may be stored, the reserve pool provides a source of product for the low production years. A tart cherry reserve pool in a large production year results in a decrease in supply because handlers withhold a proportion of the current crop. With inelastic demand, a small shift in the supply curve results in a relatively larger impact on grower prices, total value of production, and total value of production per acre. In addition, the storage of cherries in large crop years helps alleviate the problems associated with glutted markets. In short crop years, cherries stored in the reserve pool are used to supplement the crop. This results in a small increase in supply and with an inelastic demand this tends to dampen prices. The operation of the reserve pool provides the industry a coordinating mechanism that reduces the variation in supply and prices.

Models to Estimate the Impact of the FMO on the Value of Production Per Acre at the Grower Level

Two econometric models were developed to evaluate the impact(s) of the FMO on Value of Production at the grower level. Regression analysis is a statistical technique used to quantify relationships between two economic factors while taking into account the impact of other factors. Data used in the regression models may be seen in Appendix Table 1.

Since the operation of the reserve pool has been the primary activity conducted under the FMO, it seems appropriate to develop econometric model(s) that test and measure the effectiveness of this tool.

In the first model, the estimated equation representing the relationship for the real total value of production per acre (RTVPA) at the grower level is as follows:

RTVPA = -1186.29 + 6.23 TU + 42.28 RGP - 3.85 (CI) +211.80 (DV)
(-3.66) (7.14) (12.41) (-2.69) (3.02)

where:

RTVPA = Real total value per acre (dollars per acre)
TU = Total utilization (million pounds)
RGP = Real grower price for cherries utilized for processing (cents per pound)
CI = Carry-in inventory (million pounds, considers "free inventory, not total carry-in)
DV = 0-1 Dummy variable for the marketing order.

The numbers in parentheses below each term in the equation are the t statistics; these indicate the degree of statistical validity for the estimated coefficients. All of the variables in the first equation are statistically significant at any normal level of statistical significance. The equation has an Adjusted R-square of .9326 meaning that the equation explains 93 percent of the variation in the real value of production per acre. The R-square is a statistical measure that ranges from 0 to 1. A measure close to one indicates that the regression equation as a whole explains the variation in the dependent variable, which is the real total value of production per acre. An R-square greater than 0.80 is considered high and indicates a good fit for the equation.

The positive estimated coefficient for total utilization indicates that higher levels of utilization result in higher real values of production per acre. Similarly, higher real grower prices result in higher real values of production per acre. Carry-in inventory is estimated to have a negative impact on the real value of production per acre. Thus all signs on the coefficients are as expected.

The equation indicates that the existence of the marketing order for the years 1972-2006 is associated with a $211.80 increase in the real value of production per acre. This statistic can be compared with the average real total value per acre in the non-market order years, indicating that the marketing order increased real total value per acre by about 24 percent ($212/$882). It should be remembered that the model, where 1= the existence of a marketing order and 0=no marketing order, does not distinguish between any differences in operating policies or procedures between the two FMO marketing orders. However, it was found to have a positive and statistically significant impact on the real value of production per acre during the years when a marketing order has been in effect.

Since the main policy tool of both marketing orders is the operation of the reserve pool, we estimated a second equation as follows:

RTVPA = - 676.81 + 6.08 (M) + 9.15 (RGP) – 9.17 CI + 3.99 GR
(-1.30) (3.39) (8.35) (-4.85) 1.96

Where:

RTVPA = Real total value per acre (dollars per acre)
M = Movement of product out of first handlers' inventories (million pounds)
RGP = Real grower price for cherries utilized for processing (cents per pound)
CI = Carry-in inventory (million pounds, considers "free inventory", not total Carry-in)
GR = Additions and releases from the reserve pool (million pounds).

The last term in the equation, GR, is the key policy variable used by the Cherry Industry Administrative Board (CIAB), in management of the reserve pool. The Adjusted R-square for this equation is .8684. **Again, the t-values in parentheses indicate that all the variables in the equation are statistically significant, although the significance of the GR variable is not as strong as the 0-1 dummy variable used in the previous equation.**

The GR variable could have one of three signs—a plus sign (+) when reserves are added to the pool (which restricts supply); a minus sign (-) when reserves are released from the pool; and a zero (0) in years when no supplies are added or released from the reserve pool. The equation indicates that each million pounds added to the reserve pool is associated with an increase in the real value of production per acre by $3.99. As an illustration of what this coefficient means, consider the years of the second marketing order (1997-2006) when reserves were added to the reserve pool seven times, for a total of 216 million pounds of cherries, or an average of about 31 million pounds for each year. The coefficient indicates that the real value of US production per acre would increase by $124 due to the addition of 31 million pounds to the reserve pool, representing an average increase for the years that reserves were added to the pool. Similarly, when a million pounds is taken out of reserve pool and released on the market, the real value of production per acre would decrease by $3.99. Interestingly, there was a greater use of the reserve pool additions in the second order from 1997 to 2006 (7 times, total of 216 million pounds) than in the first order (1972-1986, four times, total of 67 million pounds).

Thus the reserve pool serves a number of functions. It stores supply in surplus years, which results in a bit of a higher price, although this is in a surplus year and the reserve pool helps to moderate the impacts of glutted markets. But, the reserve pool also provides supply in short crop years, which tends to have a price-dampening influence. However, the advantage of having enough supply to maintain markets likely outweighs any price dampening effects.

The two estimated econometric models are complementary and provide two different ways to estimate the effectiveness of the reserve pool under the FMO while

taking other economic factors into consideration. In the first equation a 0-1 dummy variable is used to see if the reserve pool has had a positive impact on the real value of production per acre. In the second equation a variable representing the storage and release of the reserve pool is used to test whether this activity positively impacts the real value of production per acre.

Qualitative Differences Between the First and Second Federal Marketing Orders

While a major emphasis of both the first and second Tart Cherry Federal Marketing Orders was supply management, the Orders operated with significantly different mechanisms.

<u>During the first Order (1972-1986);</u>

1. The supply management regulation was directly on the grower. The first order applied only to the eastern USA (WI, MI, OH, PA, and NY).
2. Growers met supply regulation requirements through a specifically mandated combination of in-orchard destruction and withholding product from the market, the "set-aside".
3. The only products allowed in the set-aside were 30 lb. tin pails of 5+1 RTP cherries grading USDA Grade "A".
4. Growers paid a processing fee to processors to produce this set-aside product on their behalf.
5. Once specific lots of processed product were placed in the set-aside, no substitution of products was allowed.
6. Growers were the owners of the set-aside.
7. Releases from the set-aside were made by sales to processors at pre-determined prices set by the controlling board (CAB – Cherry Administration Board).
8. Proceeds from sales were distributed to growers on a pooling basis. Growers were paid for a particular crop over a period of about three years. This meant that growers bore all the market risk as well as the opportunity cost of interest for the delayed payments received in subsequent years.

<u>During the second Order (1997-present)</u>;

1. All regulation is on the handler (processor), although the effect of this regulation ultimately impacts the grower.
2. Handlers, in conjunction with growers, have several supply regulation options including in-orchard destruction and withholding processed product from the market, the "Reserve". Others options available include export activities, new product development, charitable donations, and at-plant destruction.
3. Growers are assessed no direct fees to operate the FMO.
4. Any saleable processed cherry product may be placed in the Reserve.

5. Products in the Reserve can be replaced with other qualifying products at any time with no restrictions.
6. Handlers are the owners of the Reserves.
7. Releases from the Reserve, as determined by the CIAB – Cherry Industry Administrative Board, are made by releasing product back to the handlers involved on a pro-rata basis equal to participation in the Reserve.
8. Proceeds from the sale of the now unrestricted products are allocated between the handler and grower per mutual agreement between those parties. In many instances growers are paid for these restricted volumes prior to releases from Reserves.

While the current order is much more complicated than the previous order, it is also much more flexible and responsive to the marketplace. The new order also contains a major promotion component that was not part of the previous order.

Summary of Findings

We conclude that both FMO's had a positive impact on the value of production as measured by the real value of production per acre. The impacts are best explained by the $211 dollar increase in the value of production per acre that was shown by the dummy variable in the first equation, and by the $3.99 increase that is associated with placing one million pounds of cherries into the reserve. Over the 35-year period of 1972-2006, spanning two FMO's and an intermediate period with no FMO, we believe that the tart cherry industry was better off operating pursuant to the marketing order, as measured by the farm gate value of tart cherries at the grower level, than it would have been if operating without the Order. Economic theory suggests that a FMO with a similar approach to management of reserves will continue to provide returns in the future that are greater than what the industry returns would be without the FMO.

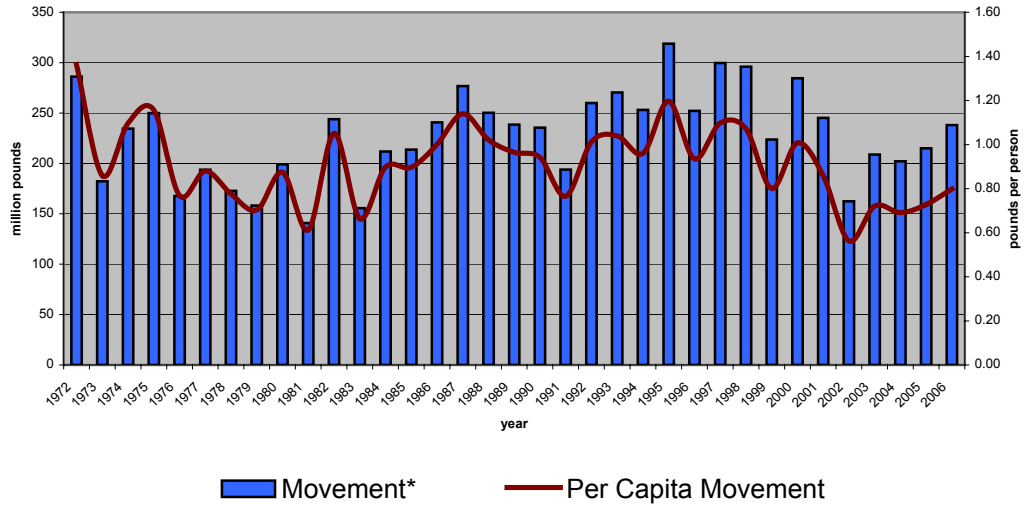
Nevertheless, it is probably unreasonable to expect an economic performance in real dollars as favorable as for the period of the first FMO (1972-1986). This is due to the "combination of other forces at work in the industry," identified in 1995 by Forker and Kaiser. One of the primary "other forces" affecting the tart cherry industry in our judgment is the apparent decrease in demand for the product. In the final section of this report, we examine the evidence of decreasing demand for tart cherries and discuss some measures to counteract this long-run problem for the industry.

The main feature of both marketing orders has been the supply control feature that allows the creation and management of a reserve pool. While the current order is much more complex than the previous order, it is also much more flexible and responsive to the marketplace. Furthermore the new order also contains a major promotion component that was not part of the previous order. This may be especially important as the more than 6000 acres of non-bearing cherries start producing in the next year or two.

Analysis of Apparent Demand

One method of assessing what is happening to demand is to examine movement and per capita movement. In Figure 2, movement for the years 1972 to 2006 is plotted, along with per capita movement. Movement is defined as the product moved out of first handler inventory between 1 July and 30 June. Movement reached a maximum of 318.9 million pounds in 1995, and a minimum for the 35-year period of 141 million pounds in 1981. The extreme variation in production, however, and the resulting impact on movement, makes it difficult to see the underlying trend for movement and per capita movement.

Figure 2. Tart Cherry Movement and Per Capita Movement, U.S., 1972-2006.



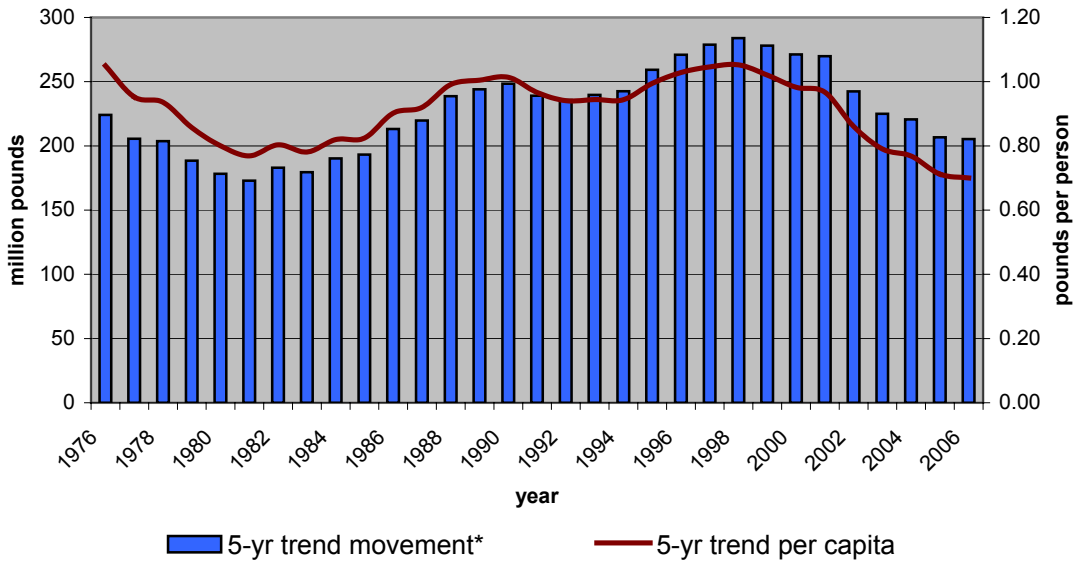
*Movement data is based on total sales, including exports

To smooth out the large variation in movement and to reveal the underlying trend, we used the technique of moving five-year averages. In Figure 3, it is shown that the trend in the moving five-year average reached a maximum in 1998 at 284 million pounds. After that year, the trend was consistently downward, reaching 205.3 million pounds in 2006.

The per capita movement trend peaked in 1998 at 1.05 pounds per person, reaching the level of 1976. In the years since 1976, per capita movement has trended down to .70 pounds per person in 2006. (It should be noted that movement was not adjusted for imports and exports because reliable data over the 35 years were not available for imports. Exports in the most recent order (1997-2006) are estimated by industry sources to have averaged over ten percent of sales annually in the early years of the second order, but for the last five years have averaged only four per cent.) Thus, both

on a total movement and a per capita basis, apparent demand is moving downward. (Static per capita movement would lead to a growth in total movement equal to the rate of population growth.) In the decade ending in 2006, the industry lost about a quarter of its market. With increased volume of new products (juice and dried cherries) per capita movement increased to .73 and .80 pounds per capita (see Figure 2 above), giving some hope that the underlying trend may be reversed in the coming years.

Figure 3. Rolling Five-Year Averages, Tart Cherry Movement and Per Capita Movement, U.S., 1976-2006.



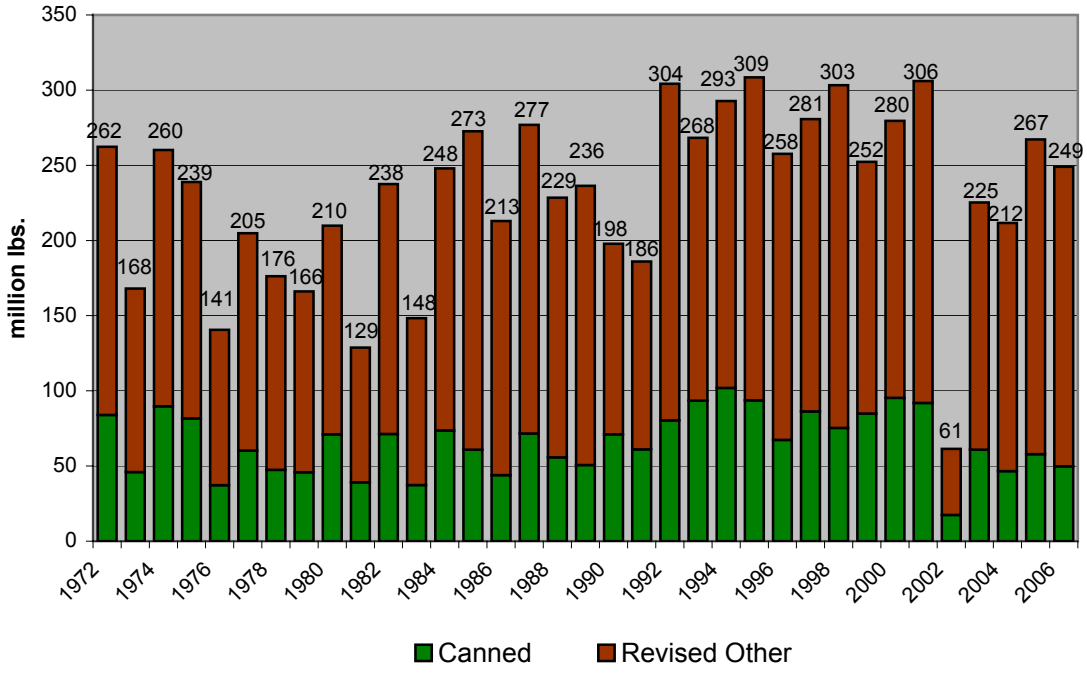
*Movement data is based on total sales, including exports

Consumption, movement, and utilization declined sharply in the short 2002 crop year. This was due to inadequate supplies even though 38 million pounds were released from the reserve pool. Tart cherries are generally used as an ingredient in a finished production (pies, fruit bars, etc) or for dried cherries, juice, and concentrate. Customers for tart cherries are generally food manufacturers and the food service industry. Severe supply shortages result in customers searching for substitute supplies (imports from Poland) or substitute fruits such as blueberries, strawberries, peaches, apples, or cranberries. Once these substitutions have been made, it generally takes years to re-build consumer confidence and, subsequently, demand.

Another aspect of demand may be analyzed by looking at trends in utilization (or pack) of farm production. From the National Agricultural Statistics Service, USDA

(NASS), Figure 4 indicates utilization for the 35 years. The period from the mid '90s on seems to be on a declining trend.

Figure 4. Tart Cherry Utilization (Pack), U.S., 1972-2006

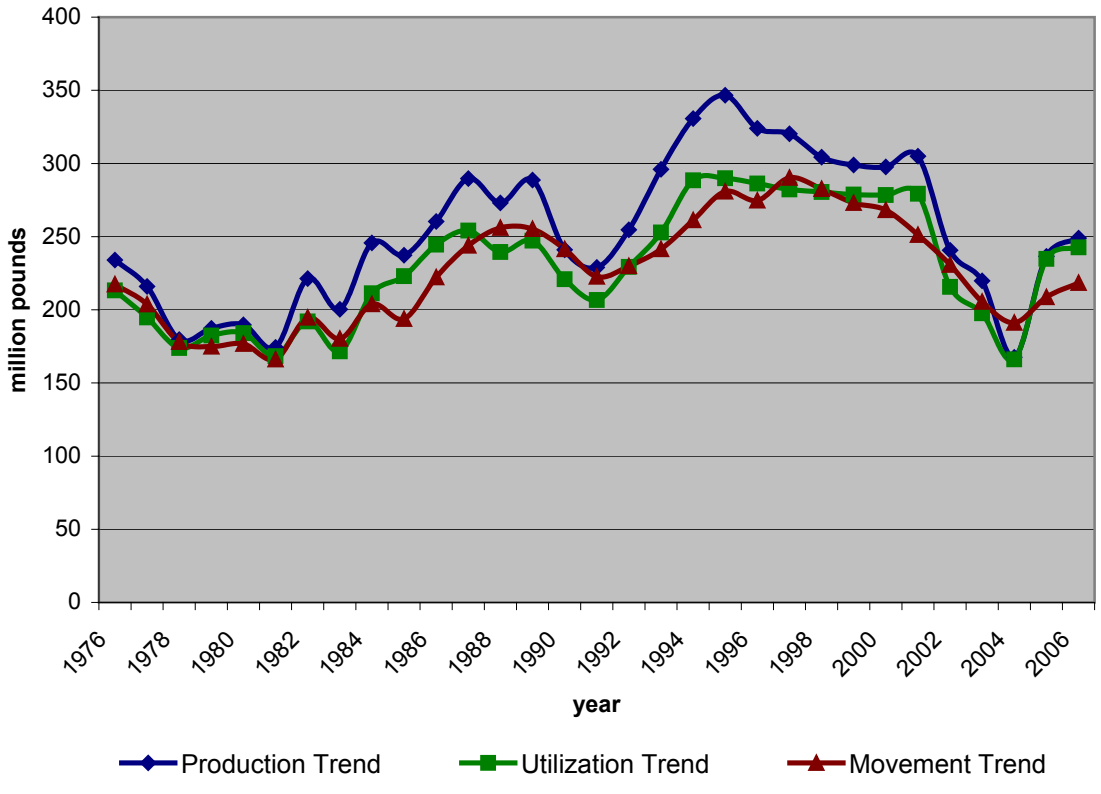


The trend analysis technique of five-year averages indicates that utilization reached a peak in 1998 at 288.6 million pounds, but fell by about 30 percent in the next eight years. However, it is within the two categories that the interesting story lies. From 1997, the trend in utilization of canned tart cherries (which includes pie filling) fell by 47 percent, and the other category fell by 18 percent. The data available do not permit us to look in enough detail at the component parts of the other category to make any firm conclusions. The "other" category includes frozen, juice, brined, and dried. (The authors revised NASS data by including the frozen category with juice, dried, and brined.) Anecdotal evidence suggests that dried cherries and juice are growing components of the revised other category. However, we can say unequivocally that in the last decade, canned tart cherries (including pie filling) were the major source of the total decline in utilization (42 million pounds).

Finally, we looked at the rolling three-year averages of production, utilization, and movement (Figure 5). We put these trends on a three-year basis since the supply formula that is used for supply management of the FMO is also based on the average of three years. Figure 5 indicates that the trend lines move roughly together for production,

utilization, and movement, implying somewhat of a balance in the industry's management of supplies with the reserve pool over each three-year time frame. The trend in movement peaked in 1997 at 290.2 million pounds. Production abandonment was a prominent feature of supply management during the years 1992-1998, accounting for a cumulative total of 245 million pounds (Cherry Marketing Institute, Inc.). This explains the noticeable gap between the trend in production and the trend in utilization during that period. The trend in movement was downward for the next seven years, reaching a low of 191 million pounds in 2004, largely due to the impact of the record low crop in 2002. Since that time, movement has recovered, but with new productive capacity (bearing acreage) coming on line, the potential for a 300 million pound crop in the near future is very real. Even though there will undoubtedly be orchard removal taking place, the newer plantings are more productive acres due to higher tree density and improved management practices.

Figure 5. US Tart Cherry Trends - Rolling Three-year Averages for Production, Utilization (Pack), and Movement, 1976-2006



This analysis suggests that major efforts are necessary by the industry to grow the dried cherry and juice category market, but also to stop the erosion in the market of the

staple products, canned and frozen. An industry-wide effort is necessary to effectively counter this major erosion in market demand.

Health and Nutrition Strategy

The health-related attributes of tart cherries have been noted, and include the following: tart cherries are rich in antioxidants, contain potent phytonutrients, and melatonin, which may aid in sleep. Emerging research suggests that natural compounds found in cherries may

- reduce inflammation and ease the pain of arthritis and gout;
- offer protection against cardiovascular disease and certain cancers;
- reduce the risk of diabetes and insulin resistance syndrome; and
- aid in treatment and possible prevention of memory loss.

There are five major challenges for the tart cherry industry to reverse the erosion of product demand. They are as follows:

1) The total size of the industry. Tart cherries had a farm value of production of $61.4 million annually (average for 2004-2006). In comparison, processed cranberries generated $228 million; juice grapes, approximately $80 million annually, and cultivated blueberries accounted for $372 million annually. In contrast, the farm value of milk production over the same period has averaged $26 billion;
2) The structure of the industry, with several major processors, compared to grape juice and cranberries, each with one dominant cooperative processor with a national brand (Welch's and Ocean Spray);
3) Demographic changes—women working more, less time for food preparation, i.e. baking; and the resulting need for new products and distribution strategies;
4) Many different commodities competing with tart cherries have well-established national generic or brand promotion programs, most of them around health themes. In this environment, it becomes a defensive strategy to promote.
5) There is a lack of broad availability of identifiable product in retail outlets.

Given these challenges, generic promotion may offer the best alternative for a viable strategy for increasing demand. The tart cherry industry started this year with a $1.5 million generic promotion effort—modest in terms of a national generic promotion program, but a substantial 2.3 per cent of the total value of production, a larger percentage than both the blueberry and cranberry industries designate to their promotion programs. Michigan growers are paying five percent of gross receipts for research and promotion. The generic promotion program, together with the other market development efforts might have success in expanding either the total and/or the per capita consumption of tart cherries.

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Appendix Table 1. Data Used in Regression Models

Year	Carry-in	Movement	Greserve	Dummy	Rtvaluepa	Rusgrowprice	Nomusgrowprice	Totalprocutil
			million lbs.			cents per lb.	cents per lb.	million lbs.
1972	55.3	286.2	4.8	1	1404.02	21.3	8.1	262.3
1973	30.5	182.3	-4.8	1	1768.38	42.4	19.1	168.0
1974	18.0	234.5	0.0	1	2577.53	40.2	18.5	260.2
1975	43.7	249.9	0.0	1	1320.56	22.0	10.1	238.9
1976	32.8	167.7	0.0	1	1985.22	55.8	25.1	140.6
1977	5.8	193.7	0.0	1	2798.06	54.4	29.4	204.8
1978	16.9	172.8	0.0	1	2687.47	61.0	43.9	176.2
1979	20.3	158.2	0.0	1	2556.28	61.7	47.5	169.7
1980	28.2	199.1	25.9	1	1471.68	27.3	19.9	209.9
1981	39.0	140.9	-4.2	1	1918.78	58.6	44.5	128.8
1982	26.9	243.9	-21.9	1	1101.06	17.6	13.7	237.5
1983	20.5	155.7	0.0	1	2460.01	65.5	46.5	148.3
1984	13.1	211.9	23.3	1	1723.09	28.7	24.4	248.0
1985	48.7	213.8	12.6	1	1637.18	26.3	22.1	272.6
1986	106.9	240.8	-11.2	1	1106.94	24.1	20.0	212.9
1987	79.0	276.8	-24.6	0	480.32	7.8	7.3	276.9
1988	87.7	250.3	0.0	0	926.81	19.0	18.2	228.5
1989	65.8	238.6	0.0	0	726.01	14.1	14.0	236.3
1990	63.5	235.5	0.0	0	776.90	18.1	17.6	197.8
1991	25.8	193.9	0.0	0	1635.70	41.4	46.4	186.0
1992	17.9	260.0	.0.0	0	1150.74	17.2	17.0	304.2
1993	62.1	270.5	0.0	0	738.56	12.6	11.6	268.3
1994	43.0	253.1	0.0	0	1139.63	17.8	16.0	292.8
1995	82.6	318.9	0.0	0	417.29	5.7	5.6	308.5
1996	72.2	252.2	0.0	0	831.46	13.3	15.7	257.6
1997	77.6	299.6	19.9	1	1012.35	14.1	15.5	280.7
1998	38.8	296.0	7.7	1	978.47	12.7	14.2	303.3
1999	38.0	223.7	-28.4	1	1209.65	18.8	21.6	252.3
2000	87.0	284.6	43.0	1	1343.01	18.8	18.4	279.6
2001	39.0	245.2	27.0	1	1360.44	16.8	18.3	306.0
2002	73.0	162.4	-38.0	1	704.28	42.2	44.3	61.4
2003	10.4	208.9	1.2	1	2074.66	33.3	35.3	225.3
2004	26.1	202.1	0.0	1	1526.50	26.2	32.5	211.7
2005	28.9	215.0	43.0	1	1342.67	17.9	23.5	267.2
2006	31.0	238.0	74.4	1	966.28	13.5	21.1	249.0

Carry-in = Carry-in inventory (million pounds), considers “free inventory, not total.
Movement=Product (million pounds) moving out of first handlers' inventories.
Greserve=Product (million pounds) moving in or out of reserve pool.
Dummy variable=1 (existence of marketing order) or 0 (no marketing order)
Rtvaluepa=Real total value per acre (dollars per acre)
Rusgrowprice=Real US grower price for cherries utilized for processing (cents per pound)
Nomusgrowprice=Nominal US grower price for cherries utilized for processing (cents per pound)
Total proc.util=Total processed utilization (million pounds)