

Economics of the California Processing Tomato Market

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The California processing tomato industry grew in the 1980s and 1990s but then ran into some problems. This article is a general synopsis of the processing tomato industry today and we find that the fundamentals and prospects are positive.

When you think of tomato paste or tomato sauce, Italy may come to mind. However, California, another wonderful place, is actually the largest supplier of processed tomato products in the world, with about 30 percent of global production. Italy is a distant second. The combined supply from Italy and California accounts for around 50 percent of the world's total. China and Spain are other large producers.

The California processing tomato industry enjoyed substantial growth in the 1980s and 1990s, due to higher-yielding hybrid varieties, high price years, new processing plants, and expanded acreage. However, around 2000, some industry observers predicted that the good times were coming to an end, due to an over-supply of tomatoes in the Golden State. There was a record harvest in 1999-2000, as processors reacted to the highest paste prices in a decade, and inventories built up to about one-half of the annual crop. Tri Valley Growers, one of the largest tomato processors at the time, filed bankruptcy in 2000 and this created great hardship for many growers.

However, this was not the first time that California's tomato processing industry was in trouble. Tomato paste and sauce is a global commodity that has many of the characteristics of a

typical agricultural commodity—resulting in boom and bust periods. You might recall that the mechanical tomato harvester “saved” California's processed tomato industry back in the late 1960s.

Six years ago, the doom and gloom predictions for the California industry were based on the following factors:

- relatively high grower returns for processed tomatoes compared to other crops that could lead to surging tomato acreage in the southern San Joaquin Valley;
- tomato grower forward integration creating excess processing capacity;
- declining domestic per capita consumption; and
- increasing international competition.

Pundits predicted that relatively high grower returns for processing tomatoes were going to lead to over-production, a classic farm problem. But the so-called “disequilibrium” in the processed tomato market never fully materialized. Why not? This article will review key trends in the California processed tomato industry to try to answer this question and to outline current issues facing the industry. We find that current prospects for the California processing industry are positive.

Domestic Market

To begin, consider California's tomato acreage. A few years ago it was argued that in the southern San Joaquin Valley of California, processed tomato acreage had huge potential to expand as an alternative to cotton. Cotton was a large but declining crop in the region and the claim was that higher returns for processing tomatoes relative to cotton would lead to a small share of the cotton acreage shifting to tomatoes, resulting in an over-supply

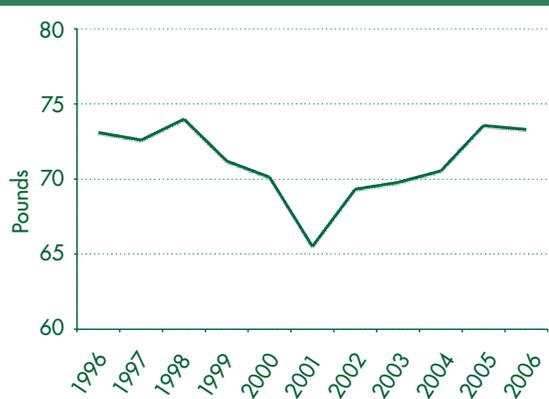
of tomatoes. At the time, some growers were also investing in new tomato processing plants and this was viewed as part of the over-supply problem. The industry feared that more grower-owned plants would be constructed.

Enough time has passed that we can now ask whether there was an expansion of tomato acres in California. The answer is no. Over the past decade, there has been no significant growth in processing tomato acreage. Furthermore, there has been no measurable trend in the size of the total harvest, so yields have also flattened out. As a result, California's share of worldwide production of processing tomatoes has declined because production has expanded in places like Western Europe and China.

For the state of California, accurate acreage figures by county are difficult to obtain, but production in the northern growing region of the state has been falling by about three percent per year over the past ten years. This decrease has been offset by an approximate three percent growth in southern valley production (i.e., in Fresno, Kern, and Kings counties). The three big processing tomato counties in California are Fresno, Yolo, and San Joaquin, in order of importance. Yields are higher moving from the north to the south, averaging about 36 tons per acre in Yolo County, 38 tons in San Joaquin, and 40 tons in Fresno.

One major reason why acreage has not expanded in the state is that overall processing capacity has not grown appreciably since around 2000. In the 1990s there was significant consolidation in processing. Private and grower-controlled firms built larger and more efficient plants that brought down

Figure 1. U.S. per Capita Consumption of Processing Tomatoes



Source: United States Department of Agriculture

processing costs and produced a higher-quality paste. The expansion phase then stopped as wholesale tomato paste prices remained relatively low for several years. Since 2000 there has been some rearranging of processing capacity among firms, with the private and grower-owned firms adding some capacity. Overall, the total capacity of the industry has settled at about 5,200 (short) tons of tomatoes per hour, which translates into a processing capacity of approximately 11 to 11.5 million tons per season. In processing tomatoes, it may be the case that “if you build it they will come” so it is quite possible that acreage has been flat since 2000 simply because no new plants were built. For the most part, processors determine tomato acres, not farmers. Growers only plant the acreage for which they can contract. Going forward, if processing capacity is added this will undoubtedly lead to higher acreage; most likely in the southern part of the state.

One piece of good news for the industry is that U.S. per capita consumption of processing tomatoes has recovered from the dip that it took five or six years ago. As shown in Figure 1, per capita consumption of processing tomatoes is now over 73 lbs (farm weight equivalent). This is very high by international standards and is, for example, almost double the per capita consumption level in Europe. This upswing in per capita consumption is important because domestic consumers purchase 90 percent or more

of the U.S. production. It would be interesting to examine domestic consumption data across products (sauces, paste, catsup, etc.) but these numbers are not available for recent years.

One striking aspect of the California processing tomato market is the relatively high level of inventories carried from one season to the next, measured as a share of domestic production. During the past ten years, beginning inventories averaged almost 40 percent of production—a high ratio compared to other storable agricultural commodities. The large domestic inventories have important implications for the dynamics of price formation. In particular, inventories help absorb shocks to the market and they serve to mute the impact of supply fluctuations. Inventories flatten the demand curve, so a given supply shock has a smaller impact on price compared to a situation with a lower inventory ratio.

The important role of reported inventories is shown in Figures 2 and 3. Figure 2 displays the relationship between annual prices received by growers (fob processing plant) and beginning inventories as a ratio to production (as of June 1), over the past ten years. The trend line in Figure 2 is quite steep and downward sloping, indicating that a lower beginning inventory ratio is correlated with a higher average farm price. The correlation coefficient (which measures the degree to which two variables are linearly related) between inventories and the farm price is -0.65 . Without attributing causation, we can state that this high negative correlation indicates that whenever beginning inventories were large, the farm price tended to be low.

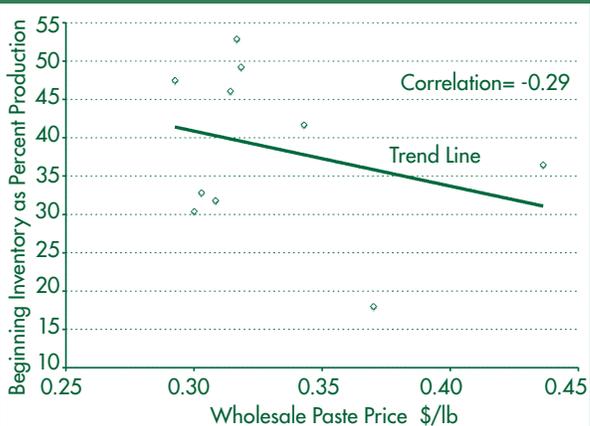
Figure 3 shows a similar pattern between inventories and the wholesale paste price. The correlation between inventories and the paste price is -0.29 , suggesting that when inventories were relatively high the paste price was relatively low. The implication is that a

Figure 2. Relationship between Farm Prices and Beginning Inventories: Crop Years 1996 to 2005



Source: Farm Price is fob Processing Plant from USDA/NASS. Inventories as of June 1 from California League of Food Processors.

Figure 3. Relationship between California Wholesale Paste Price and Beginning Inventories: 1996 to 2005



Source: Paste price in 55 gal drums, from The Food Institute. Beginning Inventories as of June 1 from California League of Food Processors.

build-up of inventories may tend to drag down the domestic paste price, because the market is largely driven by domestic fundamentals.

Almost all of the processing tomato production in California is forward contracted, normally well before the season starts. Contracting is common for most processing vegetables in the United States, but processing tomatoes are unique in that a single bargaining association—the California Tomato Growers Association (CTGA)—represents the majority of growers. The CTGA negotiates with each of the nine processors and, as a result, farmers in California all receive approximately the same price in a given season, adjusted for quality and in some cases time of delivery. We see from the bottom line in Figure 4 that the price received by California growers has been relatively constant over the past ten years. Compared to most U.S. agricultural commodities, the price of processing tomatoes is incredibly stable. The coefficient of variation (cv) measures the variation of a variable in proportion to its mean, and for the grower price shown in Figure 4, the cv is only seven percent. The wholesale paste prices shown in Figure 4 have more variability over time—the cv is 13 percent. So it appears that the practice of contracting virtually the entire crop not only lowers the growers' price risk within a season, but also across seasons. Acreage appears to adjust from year to year to restore some balance to the market (if inventories deviate from the mean) but price fluctuations do not serve to fully equilibrate the market. Rather, this is apparently accomplished through grower-processor negotiations. Managing a market through non-price mechanisms is often a second best solution.

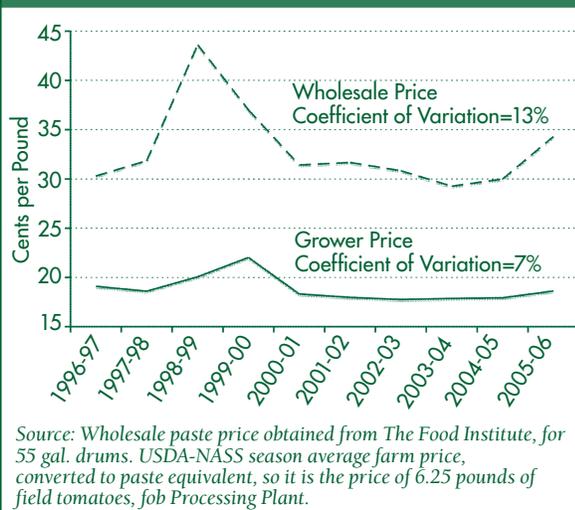
We now turn to the processor side of the equation. In Figure 5, we plot the estimated processing “gross margin” over ten years. This margin is the difference between what the processors

receive for the paste and what they pay for field tomatoes. As alluded to earlier, gross margins were relatively high in the 1980s and early 1990s and this led to an expansion of processing facilities at that time. The estimated gross processing margin during recent years averaged 14 cents per pound of paste, lower than the margins during the golden years of the 1980s. The coefficient of variation for processor margins is 24 percent, almost double the volatility of the paste price, suggesting that processors absorb most of the price risk inherent in the market.

Global Market

The United States both exports and imports tomato paste, sauce, and other products. This is an example of what economists call intra-industry trade. Figure 6 shows that U.S. net exports (exports minus imports) are positive on balance and have risen since the lows achieved in the 1999-2000 season. Both tomato paste and sauce exports have risen over the last six years. In the most recent completed season (2005-06), exports of processed tomato products totaled 1.78 billion pounds (about 890,000 tons), farm weight equivalent. This means that slightly less than 10 percent of the crop is exported. Exports of tomato paste to Mexico have enjoyed strong growth together with those to Canada. These NAFTA partners now purchase about 65 percent of U.S. export sales of processed tomato products. At the same time exports to Japan have fallen, most likely due to competition from China. Nonetheless, Figure 6 demonstrates that international competition has not squeezed California out of the world market.

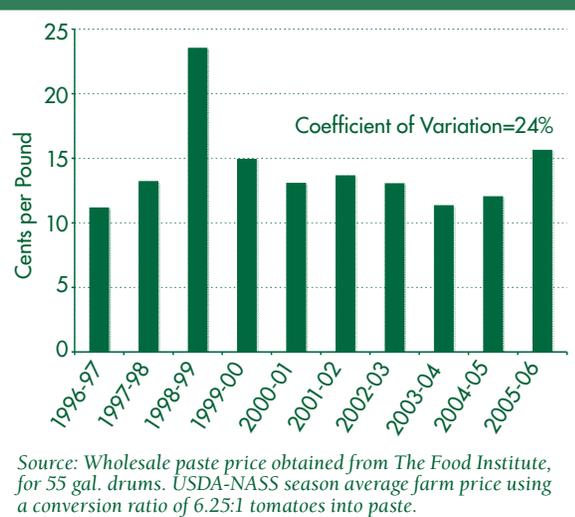
Figure 4. Wholesale Paste Price and Grower Price (cents/lb): Crop Years 1996 to 2005



International trade in processed tomato products is influenced by a number of factors, including protective tariffs. The United States imposes an import tariff of 11.6 percent on tomato paste, which provides some protection to the California processors. At the same time, other importers (such as the EU) use tariffs and other barriers to protect tomato products from import competition and this limits market access for California exporters into certain countries.

The concerns regarding increased international competition mentioned

Figure 5. Estimated Processor Gross Margin (cents/lb): Crop Years 1996 to 2005



above were mostly based upon fears of China's rising production and exports. Like many sectors in California agriculture, the local processing tomato industry was and is concerned about developments in China and some view China as a threat to California's industry.

According to USDA information, China's paste production capacity has doubled in the last three years and processing tomato acreage has risen by about one-third. China is clearly on the move in this industry as in so many other areas. This year, China is expected to produce 4.5 million (short) tons of processed tomatoes, about 40 percent the size of the typical California crop. However, China's processed products are mostly exported, unlike in the case of California. The USDA estimated that China produced 1.65 billion pounds of paste in 2005-06, of which 70 percent was exported—almost double the volume of paste and sauce exported by the United States. Paste exports from China account for one-third of global exports.

China's future role in the global processed tomato market should not be underestimated. After economic reform in China 25 years ago, the USDA kept forecasting that China was going to become a huge importer of wheat and this has not yet happened. About 10 years ago, Lester Brown wrote a book that aimed to give us all a wake-up call with a well-publicized forecast that China was going to starve the world. He was wrong because he underestimated China's ability to increase food production. Will China flood the world with tomato paste, or will domestic consumption rise so rapidly in that country that it will start importing processed tomatoes? It is too early to tell. However, we do know that most of China's processing tomatoes are produced in Xinjiang and Inner Mongolia. These regions lie to the far Northwest in China and they are economically

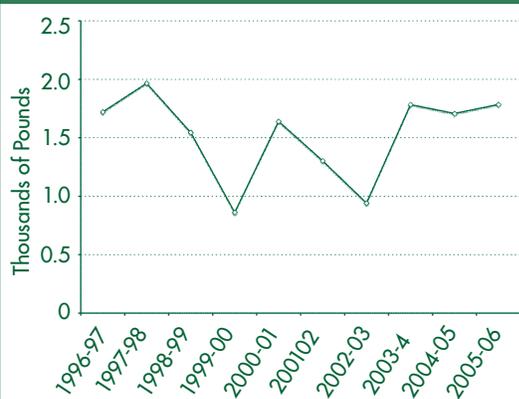
depressed compared to other parts of China. This is relevant because China's central government is committed to investing heavily in these relatively poor regions, as the road to economic development for the Northwest is through the production of exportable agricultural crops like processed tomatoes. The Northwest has fallen behind other parts of China in terms of economic growth.

The potential for expanded acreage in China and associated export growth is strongly affected by the dynamics of European Union (EU) farm policy, because the EU is the major destination for China's processed tomato exports. Italy is the number one market for China's tomato paste and puree exports, accounting for around 25 percent of China's offshore sales over the past three years. Most of the tomato product imports into Italy are reprocessed and re-exported. In 2004, Italy introduced new labeling regulations that favored domestic production but, so far, these regulations have not resulted in any significant reduction of imports from China. More importantly, EU tomato production subsidies (currently about \$28 per short ton for within quota production) are expected to be lowered and "decoupled" from production. Subsidy reform in the EU could lead to production declines there, which is good news for the California industry. So any fear of China flooding the world market is to some extent buffered by developments in the EU where production might fall.

Summary

This article has examined the basic economics of the tomato processing industry in California in the context of the global market. We conclude that it is a market driven by domestic supply and demand fundamentals, with trade playing a minor role. This is partly because trade in tomato products has tariff protection in the

Figure 6. Net Exports of U.S. Processed Tomatoes



Source: USDA, ERS

United States and elsewhere. However, trade is not irrelevant because China is now a player in the export market for tomato paste and this has kept a lid on international prices. Policy reform in the EU could very well result in a rise of international prices if EU production drops along with lower subsidies.

Processed tomato inventories carried from one crop to the next are relatively high in California and these inventories tend to reduce any impact of supply shocks. Farm prices for processed tomatoes are exceptionally stable for an agricultural commodity. The processors' margin is much more volatile than farm prices, suggesting that processors carry much of the price risk in the market. Gross processor margins have remained relatively low in recent years, compared to the previous two decades. This is another reason why the industry has shown no signs of growth. But as the California industry goes forward, the fundamentals are strong and international demand may lead to an expansion of acreage and processing capacity.

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