

# Market Power in the Northwest D’Anjou Pear Industry: Implications for California Agriculture

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This study used the winter pear industry to illustrate some of the impacts of retail consolidation involved in the continuing market transformation experienced by the fruit and vegetable industries in California. Buyer market power used by retailers appears to be modest, but has been growing over the last 20 years.

According to a number of studies, the changing dynamics in the retail marketplace are having a significant impact on the California produce industry. Consolidation among grocery chains, aggressive buying practices, and new marketing strategies have altered the balance of power between suppliers and retailers. The rapid consolidation among grocery retailers in the late 1990s led to more market power in the hands of retailers and fewer opportunities for producers and/or shippers to influence prices. According to the Produce Marketing Association, in 1999 the top 10 chains accounted for 53 percent of grocery sales; in 2005 these firms accounted for 68 percent of sales.

A number of recent studies suggest there has been, and continues to be, an increasing disconnect between farm gate prices and prices at the retail level in the tree-fruit and vegetable industries. For example, the grower proportion of retail price (or the farm-retail price spread) for the California tree-fruit industry declined from 29 percent in 1985 to 16 percent in 2004. Similar changes have also occurred in other produce markets. The decline in producer prices for Green D’Anjou (winter) pears since the mid 1990s has prompted questions from Northwest tree

grower organizations about the reasons why this long-standing stable market has changed to the extent that producer prices have declined while retail prices for D’Anjou pears have increased.

In a detailed analysis of the Northwest D’Anjou Pear Industry, we found evidence to suggest that, while there has been recent declining consumption and increasing imports of pears, retail consolidation is an important cause of declining producer prices in the face of consumer price increases. While the winter pear industry is concentrated in Oregon and Washington, it serves as a case study of what may be occurring in similar industries in California. Therefore, this article focuses on our analysis of the D’Anjou pear industry study to illustrate some of the economic issues involved in the continuing market transformation experienced by fruit and vegetable industries in California.

## Retail Consolidation and Market Power

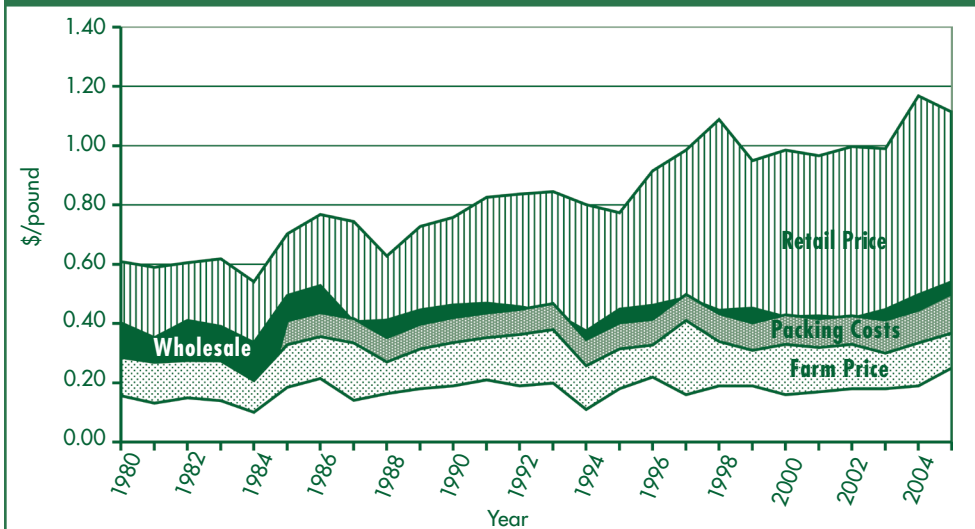
Mergers, acquisitions, and internal growth among grocery retailers are acknowledged to have been responsible for significant increases in the market shares of grocery retail outlets. Concentration of market shares, by itself, does not necessarily indicate the presence of market power. But they are one of a number of indicators of possible market imperfections that may lead to increased market power. For example, retail census figures from 1987 to 1999, show that the market share of the top four grocery retail outlets rose from 17 percent to 27 percent; the top eight firms from 26 percent to 38 percent; and the top 20 firms from 37 percent to 52 percent. Local (metropolitan area) market shares are much higher than national levels.

Another indicator of the impact of this increasing consolidation at the retail level is the increasing incidence of retailers dealing directly with shippers and bypassing wholesale and brokerage houses altogether. A recent analysis suggests that, while shippers are concerned that recent retail consolidation has led to increased market power and a growing incidence of fees and services, retailers argue that these new trade practices reflect their costs of doing business and the demands of consumers.

Econometric results confirming the presence of buyer or seller market power vary by commodity. For example, many studies indicate that evidence of some degree of retail market buying power is more likely to appear among highly-perishable commodities (tomatoes and lettuce, for example) than for commodities that are semi-storable and more elastic in supply. Apples, oranges, grapefruit, table grapes, and winter pears can each be stored to some extent, until prices are more favorable. The Red Delicious f.o.b.-retail margin was found to be significantly wider than it would be under competitive pricing, causing a reduction of both producer and consumer welfare. A study of table grapes confirmed seller market power, but found that buyer market power was inconsequential. Similarly, retail orange prices appeared to exhibit considerable market power on the selling side, but the use of buyer market power was inconsistent. Grapefruit retail prices also consistently exhibited seller market power, but exhibited buyer market power in only 60 percent of sample cases.

Only a handful of studies have been conducted on the Pacific Coast pear industries. One study evaluated promotion effectiveness by forming wholesale

Figure 1. D'Anjou Price Point Comparisons, 1980–2005



demand equations for winter pears, which were then estimated for eleven U.S. marketing regions. Empirical results found the average own-price elasticity for D'Anjou pears to be approximately -0.5 across the eleven regions. Another study investigated imperfect competition in pear processing using a “benchmarking” technique, and rejected the hypothesis of perfect competition in both the input (raw product) and output (wholesale) markets for fruit cocktail and fresh pack Bartlett pears. A more recent study of the Northwest D'Anjou pear industry found a fairly modest degree of seller market power exercised by D'Anjou packer-shippers for the 1993 to 1998 marketing seasons.

### Marketing Margin Analysis

A marketing margin is the difference between the price consumers pay at the retail level and the price producers receive at the farm gate. All necessary processes and services required to transfer winter pears from the producer to the consumer are included in the marketing margin. For the marketing margin to change, retail and farm gate prices must change disproportionately to each other. Any degree of change in market competitiveness could cause a change in the margin without a corresponding change in marketing costs.

The D'Anjou marketing margin showed a significant increase between 1980 and 2005 (see Figure 1). Our detailed study of the marketing margins shows that packer-shipper costs, represented as the farm-f.o.b. margin, did not increase and, therefore, have not contributed to the widening marketing margin. Transportation costs did show an increase caused by rising fuel costs, primarily since 2000. However, despite higher transportation costs, the D'Anjou f.o.b.-wholesale margin showed no statistical increase over the study period. We concluded that increases in freight costs have been small enough to be absorbed by the distribution sector and not passed on in the form of higher prices.

Analysis of an index measuring grocery retail unit labor costs indicated a substantial increase in labor costs between 1987 and 2005. However, this increase was not unique to grocery retailers. Similar increases in labor cost were evident at the farm and wholesale levels. Data measuring farm and wholesale labor costs also explained approximately 80 percent of the variance in the wholesale-retail margin.

These results indicate that while input costs (particularly labor) have risen in several stages of the D'Anjou marketing chain, only grocery retailers have been able to pass these increases on in the form of higher prices. Retail prices also

exhibit a positive correlation with the quantity of pears being supplied. We concluded that such findings demonstrate that retailers do not operate under the same competitive market conditions as producers, packer-shippers, and distributors. Instead, grocery retailers are able to set D'Anjou prices at levels that allow them to maintain desired margins and profit levels.

### Do Retailers Exhibit Buyer Market Power?

Seller and buyer market power can be represented in an economic equilibrium model that explains the farm-retail price spread in terms of the degree of seller market power, the degree of buyer market power, the price elasticity of retail demand, the price elasticity of farm supply, and retailer variable or marginal costs. We used the data from our study and a number of other studies to examine the potential magnitudes of buyer market power in the D'Anjou pear market using Monte Carlo simulation. Of the six parameters in the model, (retail price, farm price, price elasticity of retail demand, price elasticity of farm supply, degree of seller market power, and retail variable costs) the degree of buyer market power was most sensitive to changes in the price elasticity of supply in terms of its contribution to total variance, followed by seller market power and retail variable costs. The price elasticity of demand had little impact on the degree of buyer market power.

Assumptions about the price elasticity of supply are critical, and it is not clear what level should be assumed for the purposes of estimating the degree of buyer market power. Because D'Anjou pears are tree fruits that do not reach optimal production until the trees are 10-15 years old, are perishable and seasonal, and have few alternative uses, their supply will be highly inelastic. One study found that the short-run elasticity of Bartlett pears was 0.03. However, since D'Anjou pears are storable for up to nine

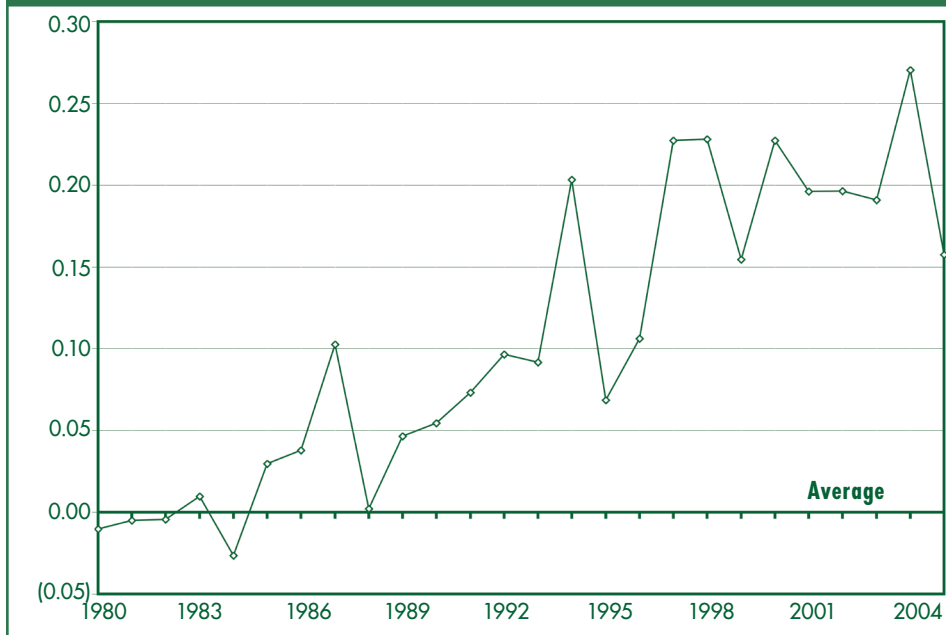
months in controlled atmosphere conditions, then this would make them more elastic than 0.03. Thus, the price elasticity of supply was varied from 0.03 to 0.2 in the simulations.

The degree of buyer market power is also sensitive to assumptions about the degree of retail seller market power. The degree of seller/buyer power can be measured as an index ranging between zero and one, with zero indicating perfect competition and no market power, and one indicating maximum market power (monopoly/monopsony). The degree of seller power exercised by D'Anjou packer-shippers for the 1993 to 1998 marketing seasons was estimated to be 0.206. However there is reason to believe that this estimate may be higher than one would normally expect to find in the winter pear market. Therefore, it was allowed to vary from 0.05 to 0.25 in the simulations.

The farm-retail price spread is also influenced by the magnitude of the assumed level of retail variable costs, which we represent in the model as a percentage of retail prices. The higher the variable cost (percentage of retail price), the lower the degree of buyer market power is required to explain the farm-retail price spread. Variable costs at the retail level are likely to be in the vicinity of 15 percent. We allowed the retail variable cost to vary between 10 and 30 percent of retail price in the simulations.

Finally, the only estimate of the price elasticity of retail demand for D'Anjou pears we found was -0.5, so the question is, would we expect the price elasticity to be lower than this? A number of studies have found that the elasticity of retail demand for close substitutes of D'Anjou pears varies from -0.30 to as high as -2.0, with most in the range of -0.35 to -0.75. Therefore, we concluded that the estimate of -0.5 for D'Anjou pears is fairly robust and allowed the price elasticity of demand to vary between -0.35 to -0.6 in the simulation.

Figure 2. Inferred Degrees of Buyer Market Power over Time



The simulation results indicated that given the reasonable ranges of variables reported above, the degree of buyer market power ranges from -0.10 to 0.80, with a mean of 0.16 and a standard deviation of 0.12. The probability that the degree of buyer market power is positive (more than zero) is 98 percent. Therefore, the simulation results indicate that there would appear to be a relatively high probability that a modest amount of buyer market power can be attributed to retailers who sell D'Anjou winter pears.

We also used the means or most probable values of the variables discussed above to examine how the degree of buyer market power has varied over the period of the study (1980–2005). We found that the degree of buyer power most likely has increased quite dramatically over the time period examined (see Figure 2). In addition, we also found that when all externally determined variables were set at levels that would result in the lowest possible magnitudes of buyer market power, the changes in retail market power over time still indicated considerable buyer market power from the mid 1990s onward.

Our results appear to be consistent with many of the previous studies

discussed above. There appears to be some market power associated with retailers in the D'Anjou winter pear market, and in all likelihood this market power has been strengthened by retail consolidation over the last 20 years. Although this buyer market power could be used to drive producer prices to levels that would be low enough to drive producers out of business (and there is some evidence of this in the California tree-fruit industries), it does not make any sense for retailers to do this because in such an event, winter D'Anjou pears and other fruits would eventually disappear from the market, hurting both consumers and retailers.

In all likelihood, market power is used by retailers to maximize their net revenues subject to maintaining an equilibrium in the market where producers have sufficient incentive to continue pear production, albeit with lower returns than they would obtain with competitive procurement.

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