# The Effects of Navel Orange Prorate Suspension on F.O.B. to Retail Price Spreads

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## ABSTRACT

*The effects of the navel orange prorate suspension on packinghouse to retail price spreads are analyzed. When compared with price spreads for the 1986 season, F.o.b.-retail price spreads declined for Atlanta and San Francisco, but increased for Dallas.*

## INTRODUCTION

The navel orange marketing order authorizes the Navel Orange Administrative Committee (NOAC) to regulate shipments of all California-Arizona fresh navel oranges to the U.S. and Canadian markets. In January 1985, Secretary of Agriculture John Block abruptly suspended the right of NOAC to prorate shipments of fresh navel oranges. With 48 percent of the year's crop still to be marketed, the suspension marked the first time in 32 consecutive seasons that the industry operated without volume controls on a substantial portion of its production.

Suspension of the prorate sparked controversy among its supporters and critics. Supporters argued that vertically integrated supermarkets would hold retail prices at artificially high levels while f.o.b. (price of navels packed and loaded on the truck) prices would plummet. Critics countered that the prorate raised consumer prices of fresh navel oranges, caused resource misallocation, and reduced market efficiency.

The analysis in this paper focuses on how f.o.b. to retail price spreads behaved during and after the 1985 prorate suspension. A model relating f.o.b.-retail price spreads to retail prices, truck rates, and other variables is estimated for California- Arizona navel shipments to Atlanta, Dallas, and San Francisco. The model results suggest that f.o.b.-retail price spreads declined for Atlanta and San Francisco during the prorate suspension; similar price spreads increased for Dallas.

## THE STATISTICAL MODEL

The statistical model specified to analyze f.o.b.-retail price spread behavior is known as the "markup" model. Rather than simply comparing price spreads during and after the prorate suspension, the markup model is specified to control for other factors affecting price spreads. In the markup model, retailers are assumed to have markup rules for setting retail prices. In general, the markup rules may be absolute or percentage markups, or even some combination of the two.

The model is specified as:

(1) $$M_{it} = b_0 + b_1P_{it} + b_2TR_{it} + b_3D1985 + b_4DMAY + e_{2it}$$

where

$M_{it}$ = f.o.b.-to-retail price spread in market i, week t; dollars per lb.

and $M_{it}=Pr_{it}-Pf_{it}$

$Pr_{it}$ = simple average retail price, all C-A navels, in city i, week t; dollars per lb. (Source: **Sunkist Growers, Inc.**).

$Pf_{it}$ = weighted average f.o.b. price, Southern California, in city i, week t. Weighted by size, grade, and production district price differentials; dollars per lb. (Source: **Western Citrus Report**).

and

$P_{it}$ = market price C-A navels in city i, week t; dollars per lb. Calculated as simple average of retail prices ($Pr_{it}$) and advertised prices (Sources: Advertised prices, Atlanta Constitution, Dallas Morning News, San Francisco Chronicle, San Francisco Examiner; Retail prices, Sunkist Growers, Inc.).

$TR_{it}$ = average truck rate for citrus from San Joaquin Valley to market i in week t; dollars per 40,000 lb. unit (Source: **Fruit and Vegetable Truck Rate and Cost Summary**)

D1985 = 1, if prorate suspension period February through May, 1985; 0, otherwise.

D-MAY = 1, if month equal to May; 0, otherwise.

TIME = Time trend: 1, 2, 3....., 42.

i = Atlanta, Dallas, San Francisco

t = the week in which the variable was observed.

A percentage markup is represented as some percentage, $b_1$ , of retail price, $P_{it}$ , while an absolute markup is represented as a fixed amount, $b_0$. The dichotomous variable D1985 was included to isolate the effects of the prorate suspension during the 1985 season from the following season when the prorate was reinstated. The other dichotomous variable DMAY was specified to capture substantial seasonal price and quantity variation as California Valencia shipments increase at the end of the navel season. Truck rates were included to account for the spatial price differences among the cities. The time trend variable represents interseasonal trends, possibly due to shifts in retail demand or changes in bearing acreage.

## DATA AND ESTIMATION OF THE MODEL

Weekly observations on all variables in the model were collected from the various sources indicated above. The three cities were chosen to represent markets on the east coast, central states, and on the west coast. Note that all prices were deflated by the Urban Consumer Price Index to remove any inflationary trends.

## SUMMARY

A markup model relating packinghouse (f.o.b.) to retail price spreads for Atlanta, Dallas, and San Francisco was estimated using weekly data for the 1985 prorate suspension period and the following 1986 California-Arizona navel orange season. F.o.b.- retail price spreads were \$0.013 lower in Atlanta and \$0.012 lower in San Francisco during the prorate suspension than during the following season when the prorate was reinstated. The price spread in Dallas appears to have been higher during the prorate suspension although the statistical results are inconclusive.

Variation in price spreads in Atlanta, Dallas, and San Francisco was likely related in any given week so that regression analysis for each city in isolation was not appropriate. An estimation technique referred to as "seemingly unrelated regressions" was utilized to estimate the three equations together. The estimated values for the parameters of interest are reported below.

**Table 1**

**F.O. B. - Retail Price Spreads for Atlanta, Dallas, and San Francisco for 1985-1986 Navel Seasons**

| Dependent Variable | Constant | P | TR | D1985 | DMAY | TIME | $R^2$ | DW | Wald |
|---|---|---|---|---|---|---|---|---|---|
| Atlanta | -0.03 | 0.99 | -5.52E-05 | -0.013 | -0.024 | 0.0001 | 0.74 | 1.41 | 13.69 |
| | (-1.14) | (11.96) | (-1.58) | (-2.02) | (-4.47) | (1.39) | | | |
| Dallas | 0.072 | 0.553 | -1.62E-04 | 0.008 | -0.022 | 0.0004 | 0.43 | 1.58 | |
| | (1.19) | (4.31) | (-1.37) | (.81) | (-2.14) | (2.39) | | | |
| San Francisco | -0.178 | 1.05 | 0.006 | -0.012 | -0.031 | 0.0003 | 0.74 | 1.49 | |
| | (-1.75) | (12.94) | (1.01) | (-1.74) | (-4.78) | (1.96) | | | |

The $R_2$ measuring the proportion of the variation in f.o.b.-retail price spread explained by the other variables, indicates that the three equations fit the data relatively well. The DW and Wald statistics indicate the the unexplained variation in price spreads in a given week is not systematically related similar unexplained variation for previous weeks. The figures in parentheses are t-statistics. Values for a t-statistic of more than 1.65 indicate that the corresponding estimate is statistically significant.

## RESULTS

The behavior of f.ob.-retail price spreads during the prorate suspension is compared to the behavior of price spreads for the following season with the dichotomous variable for the prorate suspension period, D1985. The estimated coefficients for D1985 indicate that the f.o.b.-retail price spreads decreased by $0.013 and $0.012 per pound in Atlanta and San Francisco, respectively. In Dallas, however, the price spread increased by $0.08 although the t-statistic for D1985 in Dallas indicates that the coefficient is not statistically significant. The nearly identical decrease in price spreads for Atlanta and San Francisco suggests that proximity to California shipping points is not a major determinant of f.o.b.-retail price spreads.

The decreased f.o.b.-retail price spreads during the prorate suspension suggest that allegations made by prorate supporters of increased price spreads were unfounded for Atlanta and San Francisco. The price spread results for Dallas are inconclusive because the estimated increase in Dallas f.o.b.-retail price spreads is not statistically significant.

How on-tree returns were affected by changing f.o.b.-retail price spreads during the prorate suspension is difficult to assess. Price spreads declined in Atlanta and San Francisco, but margins for packing may have changed during the prorate suspension since relatively more navels were marketed. Thus lower f.o.b.-retail margins may not have translated directly back to the producer because of the possible changes in packinghouse margins. Information on packinghouse margins during the prorate suspension is not available for assessing on-tree returns.