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and 1995/6 Season Price Forecasts**

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## **Pecan Supply Factors and 1995/6 Season Price Forecasts**

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“I have no way of judging the future but by the past.” Patrick Henry

The perilous nature of price forecasting is accentuated in that (1) you could be wrong and (2) no matter how accurate the forecast, it will be too low for the sellers and too high for the buyers. Nevertheless, the purpose of this article is to update last year's fearless pecan blend (weighted value for improved and native) price forecast in the November 1994 *Pecan South*. While the '94/5 price forecast was for the blend price only, this year we grow bolder and attempt 1995/6 season forecasts for the U.S. blend, improved and native pecan prices. As noted in the November *Pecan South* article, these U.S. season's level prices are merely indicators of general price levels rather than specific price forecasts for a particular variety of pecan at any specific production location.

Last November the 1994/5 season's blend price was forecast at \$1.04/pound, the same as the final blend price reported for 1994/5 (USDAA). One could grow overconfident if results were consistently good, but they won't be.

### *Supply/Demand*

Factors which influence the season's average level of U.S. pecan prices include production of both improved and native pecans, carryin stocks from last year, imports, exports, quality, supplies of other tree nuts, inflation, consumer income and so on. However, since we are simplifying for purposes of price forecasting, only production, carryin stocks in cold storage, and the annual inflation rate are employed. Imports and exports would seem to be the most important variables omitted. However, trade was not found to be statistically significant in the equations used here. U.S. pecan imports have exceeded exports during the last 10 seasons ('85-'94) except for 1988 (USDAb). The net difference between imports and exports varied from 1 to 9 percent of total U.S. pecan supply during the 5 seasons 1990 through 1994 (USDAb, p. 31).

The '95 October forecast crop and carryover stocks situation for 1995/6 is compared with the 1994/5 situation in Table 1. Ignoring the import/export situation, total 1995/6 starting domestic supply volume consisting of forecast production and June carryin stocks is essentially the same as in 1994/5. Imports may be lower this season (*The Pecan Newsletter* 9/29/95). However, while the volume expected is similar to 1994/5, the composition of the domestic supply is different. The '94/5 supply was 51 percent from carryin stocks while the forecast '95/6 supply consists of 63 percent forecast crop and only 34 percent carryin stocks. Thus, a larger percentage of the expected total supply is uncertain this season compared to 1994/5.

### *The Price Equations*

Prices for 1995/6 were forecast by two methods: equations using data in (1) levels, and alternatively, (2) first differences. Using different methods provides some reassurance if the results are similar. The data used to estimate the price equations are in Table 2. OEI and OEN are October crop estimates for improved and native pecans, respectively. CSJ is stocks of pecans in cold storage in June preceding the season. USPT, USPI, and USPN are blend, improved, and native prices, respectively. GNP87 is the price deflating term.

Price equations for each category were fitted to 15 year periods starting with 1976-1990 and then the following year's prices (1991/2) were forecast. Next, the equations were fitted to data for 1977-1991 and then the 1992/3 prices were forecast and so on through 1995/6. The equations fitted to 1980-1994 data for forecasting 1995/6 prices are shown in Table 3.

Although the coefficients were similar across all price equations, cold storage stocks seemed to influence prices a little more than either improved or native production levels, section A, Table 3. For example, a one million pound change in improved and native production and June stocks had an implied effect on improved prices of 0.406, 0.424 and 0.501 cents per pound in the opposite direction, respectively.

The equations using first differences of variables (rather than levels) had coefficients similar to those for the levels equations but with slightly better statistical results. Compare section A (levels) of Table 3 with section B (first differences).

### *The Price Forecasts*

The price forecasts for 1991/2 through 1995/6 seasons are shown in Table 4. The most "accurate" are underlined. The first difference-type equations tended to provide closer "forecasts" for the four seasons of blend, improved and native prices, being nearer to the final reported price for 8 of the 12 possibilities, Table 4. The error or difference between the forecasts and the reported prices are shown in parentheses below each forecast in Table 4. Price forecasts for the 1995/6 season were 109.1 cents blend, from 119.9 to 117.0 cents for improved and from 83.7 to 81.1 cents for native pecans, depending on which type of equation was used. Note that while the 1995/6 forecasts are all greater than the 1994/5 reported prices, they are lower than last year's forecasts in most cases. The forecasts suggest that the general price level for 1995/6 should be about the same or, possibly, slightly higher than 1994/5 due to the impact of reduced stocks and greater dependence on the accuracy of the estimated crop for the remaining supply.

While all of the forecasts in Table 4 indicated the right direction in price change from year to year, and most were relatively close to the reported prices, there were some sizable errors during the 1991/2 through 1994/5 period. Interestingly, where large forecast errors occurred for one equation, the error for the other equation was modest. For example, see the 1992/3 row in Table 4. However, this is scant comfort as one doesn't know beforehand which equation forecast will be better.

Although the point price forecasts shown in Table 4 were the best guesses of the 1995/6 prices given the data at hand and the equations used, it must be noted that the statistical confidence intervals around these forecasts were fairly large. For example, we are,

statistically speaking, only 95 percent confident that the actual blend price for the 1995/6 season will fall in a range roughly 18 cents (16 percent) plus and minus the 109.1 cents forecast in Table 4. Confidence levels were similar for the other 1995/6 point price forecasts. In summary, the 1995/6 blend, improved and native price forecasts are similar to those for 1994/5 due to the similarity of the supply situation based only on October crop estimates and the June carryover stocks, Table 4.

#### *Limitations*

These price forecasts are based on season's average prices for all pecan producing states. Hence, they are not specific for any variety or location. Imports, exports, quality, supplies of other tree nuts and substitutes are not included. The equations simply systematically summarize the regularities among season's average U.S. price and total U.S. production and stocks over 15 seasons. Prices were deflated by a GNP index (1987=100). If the industry behaves in 1995/6 as it has in recent seasons, the 1995/6 forecasts may not be wildly inaccurate. If the 1995/6 price forecasts turn out to be inaccurate, then we might conclude that (1) the crop estimates were incorrect, (2) some of the excluded variables may have become influential, and/or (3) the industry structure and operating procedures may have changed; i.e., ownership, methods of buying and selling, etc. Otherwise, the forecasts represent the general price levels expected for 1995/6. Last but not least, the statistical confidence intervals associated with the point price forecasts should be kept in mind.

#### **References**

Texas Pecan Growers Association, *The Pecan Newsletter*, 9/29/95.

Texas Pecan Growers Association, "Economist considers forecasts, cold storage to project price", *Pecan South*, November 1994, pp. 18-24.

USDAa. *Non-Citrus Fruits and Nuts*, July final report.

USDAb. *Fruit and Tree Nut Situation*, FTS-273, August 1995, p. 31.

USDAc. *Crop Production*, October 1995.

**Table 1. Supply data (inshell) 1994/5 and forecast 1995/6 season**

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SEASON	PRODUCTION		JUNE CARRYIN STOCKS	TOTAL SUPPLY <sup>1</sup>
	IMPROVED	NATIVE		
	(million pounds)			
1995/6	175.3	76.8	133.4	385.5
1996/7	175.5**	65.2**	211.0	443.7
Change	+1.2	-20.6	+77.6	+58.2

<sup>1</sup> Domestic supply excluding imports/exports and “other states” volume

<sup>2</sup> October 1996 estimates

SOURCE: USDAa, USDAc

**Table 2. October crop forecasts and final revised prices for blend, improved and native pecans, June cold storage holdings and GNP deflator (1987=100), 1981-1995.**

YEAR	OCTOBER CROP FORECASTS		PRICES			COLD <sup>1</sup> STORAGE	GNP DEFLATOR
	IMPROVED	NATIVE	BLEND	IMPROVED	NATIVE		
	million pounds		(cents per pound)			(mil. lbs.)	(%)
1981	191.9	146.1	54.5	64.7	43.7	78.0	78.9
1982	149.5	61.1	67.5	72.6	49.8	172.9	83.8
1983	178.2	114.3	58.7	67.7	44.0	141.1	87.2
1984	181.1	69.3	62.3	68.2	46.6	171.2	91.0
1985	160.9	101.8	68.0	79.1	49.7	123.1	94.4
1986	153.7	62.4	72.0	79.3	57.6	148.5	96.9
1987	193.1	97.9	53.1	60.1	37.7	159.1	100.0
1988	187.6	95.9	54.1	62.6	41.1	157.9	103.9
1989	172.9	67.5	71.5	78.6	53.8	177.8	108.5
1990	166.6	52.5	121.0	128.0	90.2	116.8	113.3
1991	166.1	86.6	104.0	114.0	83.5	113.6	117.7
1992	135.9	50.5	145.0	157.0	114.0	130.1	121.1
1993	232.4	126.6	58.6	62.9	39.6	116.6	123.8
1994	130.7	47.3	104.0	115.0	76.4	189.4	126.4
1995	158.1	73.9	101.0	112.0	72.5	133.4	128.0
1996	176.5	56.2	----	----	----	211.0	132.0**

<sup>1</sup> Nut meat cold storage converted to inshell with 40% yield factor

**Table 3. Price equations used for the 1995/6 season's price forecasts**

A. DATA IN LEVELS		INDEPENDENT VARIABLES				$\bar{R}^2$	D-W <sup>1</sup>	TP <sup>2</sup>
DEPENDENT VARIABLE	CONSTANT	OEQE	OEI	OEN	CSJ			
USPTS	243.28	-.404 (11.01) <sup>3</sup>	NA	NA	-.457 (7.18)	.90	1.49	12/14
USPIS	259.55	NA	-.406 (3.75)	-.424 (3.66)	-.501 (6.60)	.90	1.81	13/14
USPNS	198.53	NA	-.282 (3.44)	-.393 (4.50)	-.424 (7.41)	.91	1.56	13/14
B. DATA IN FIRST DIFFERENCES								
DUSPTS	2.11 (1.53)	-.379 (20.51)	NA	NA	-.430 (10.13)	.96	2.70	14/15
DUSPIS	2.28 (1.33)	NA	-.477 (9.94)	-.296 (6.67)	-.430 (8.35)	.95	2.25	14/15
DUSPNS	1.67 (0.92)	NA	-.310 (6.07)	-.302 (6.39)	-.361 (6.59)	.92	3.10	13/15

<sup>1</sup> Durbin-Watson statistic

<sup>2</sup> Turning point correspondence

<sup>3</sup> T-values in parentheses



**Table 4. Forecasts of season average U.S. blend, improved and native pecan prices based on October crop estimates and cold storage stocks from levels and first differences equations for six seasons 1991/2-1996/7**

SEASON	BLEND			USPI			USPN		
	ACTUAL	FORECASTS		ACTUAL	FORECASTS		ACTUAL	FORECASTS	
		LEVELS	DIFF		LEVELS	DIFF		LEVELS	DIFF
	(cents per pound)								
1991/2	104	<u>100.9</u> (-3.1) <sup>1</sup>	90.5 (-13.5)	114	<u>109.1</u> (-4.9)	102.9 (-11.1)	83.5	<u>77.5</u> (-6.0)	68.7 (-14.8)
1992/3	145	124.7 (-20.3)	<u>146.6</u> (+1.6)	157	132.5 (-24.5)	<u>153.3</u> (+3.7)	114	98.6 (-15.4)	<u>115.2</u> (+1.2)
1993/4	58.6	54.4 (-4.2)	<u>61.0</u> (+2.4)	62.9	59.1 (-3.8)	<u>59.2</u> (-3.7)	39.6	<u>36.7</u> (-2.9)	62.6 (+23.0)
1994/5	104	110.3 (+6.3)	<u>104.6</u> (+0.6)	115	121.9 (+6.9)	<u>121.4</u> (+6.4)	76.4	84.1 (+7.7)	<u>70.3</u> (-6.1)
1995/6	101	109.1 (+8.1)	109.1 (+8.1)	112	119.9 (+7.9)	117.0 (+5.0)	72.5	83.7 (+11.2)	81.1 (+8.6)
1996/7	?	70.6	73.9	?	75.9	81.2	?	49.1	50.3

<sup>1</sup> Error between forecast and actual in parentheses