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Economic Analysis of the Implementation of a Federal Marketing Order for Pecans

Executive Summary

This study provides an overview of the pecan industry in the US and the potential effects on supply and demand from the proposed Federal Marketing Order (FMO) for pecans. The FMO proposes that an assessment of $0.02-0.03 be charged per pound of improved pecan varieties in shell handled by handlers and $0.01-0.02 for native/seedling varieties. The approach of this study is twofold: first it focuses on the economic framework of the supply and demand for pecans; second, it looks at the costs and benefits of the FMO and other relevant economic considerations. For purposes of this Executive Summary, we have set out below a summary of the cost and benefits of the FMO and the other relevant economic considerations.

A. Generic Promotion Increases Demand and Prices. We have reviewed the literature of a number of agricultural studies to determine the effects of generic promotion campaigns on agricultural product demand and prices. Generic promotion over a wide variety of agricultural products stimulates product demand that translates into higher prices for growers than would have been the case without promotion, as shown in the table from Williams and Welch (2014) at the end of this document.

B. Effectiveness of Tree Nut Promotions; Costs and Benefits to Growers. The estimates of the effectiveness of marketing programs used for this report are based on analysis of post implementation data of marketing orders in tree nuts (almonds and walnuts) and on ex-post implementation data from the Texas pecan promotion program. These studies find that demand for product increases after the establishment of generic promotion programs. The increased demand results in increases in prices that could not be achieved without promotion. Demand increases in those studies have been as high as 6%. Our analysis allows the midpoint of these studies (between 0% and 3% in the tree nut studies) to be the best possible scenario and we have used the average of potential demand or approximately 1.5% in our evaluation for benefits of the FMO promotion authority. These marketing programs reviewed are well-established programs, so our report assumes that the proposed FMO for pecans would be less effective at least at first.

Table ES1: Proposed Initial Assessment Range (dollars per inshell lb.)

	Low	High	Midpoint
Improved pecans	$0.02	$0.03	**$0.025**
Native/seedling	$0.01	$0.02	**$0.015**

Source: FMO

Table ES2: U.S. Season Average Pecan Grower Price, (dollars per inshell lb.)

	2012	2013	2014
Improved	$1.73	$1.90	$2.12
Native/seedling	$0.88	$0.92	$0.88

Source: NASS/USDA

Table ES3: Assessment as Pct of U.S. Season Average Pecan Grower Price (midpoint of proposed initial assessment range)

	2012	2013	2014
Improved	1.4%	1.3%	1.2%
Native/seedling	1.7%	1.6%	1.7%

The cost of the assessment as a percentage is calculated by taking the midpoint assessment value for improved and native/seedling varieties and dividing it by the average prices for in shell pound of pecan for each year described in the tables.

Although handlers pay the assessments in federal marketing orders, such as this FMO, for analytical purposes and to take the most conservative case, we are assuming that 100% of the assessments will be reflected in prices paid to growers, i.e. the growers will bear the cost initially. As you note from ES3 above, the assessments/costs are a small percentage of the grower's price even if the grower bears all assessment costs.

Using historical data and information provided by farmers in the different production regions and NASS/USDA, and using price per pound data for 1997 - 2014 a mathematical simulation model was created. We used Monte-Carlo simulation methods for the distributions of key output variables crucial for analyzing feasibility of future business decisions under risk. The simulation model is programmed in SIMETAR©, a simulation and risk analysis software embedded as an add-in in Excel (Richardson, Schumann, and Feldman 2006). The framework of creating a representative farm to analyze risk is widely used in policy analysis, including potential impacts of the Farm Bill (Richardson, Schumann, and Feldman 2006). This avoids using averages, which can be misleading, and instead use data from the entire distribution of historical data. We then apply the 1.5% average generic promotion demand increase to the calculations related to pecans and obtain the following results:

Table ES4: Benefits of Generic Promotion in the Proposed FMO

Benefits per lb of FMO			
	Low	High	Average
Improved pecans	$0.040	$0.096	**$0.063**
Native and seedling	$0.027	$0.042	**$0.036**

The procedure we used involves taking the historical yearly prices from 1997 to 2014, and using the full distribution over those prices to obtain Monte-Carlo simulation for 500 possible prices to obtain the expected average price without the FMO intervention. We then adjusted the historical prices with a demand increase of 1.5% to simulate the possible prices with marketing promotion efforts due to the FMO to get an expected price increase of $0.063 with the FMO for improved pecans as shown in Table ES4. In a similar fashion, for native/seedling the valuation is done using the historical price for a Monte-Carlo simulation before the intervention (without the FMO) and after the marketing program (with FMO). The result is a $0.036 increase in price for native varieties.

The low and high bound were calculated using a simulation with low (0.5%) and high (3.0%) price increase scenarios. The potential benefits due to promotions through the FMO are between 4 and 9.6 cents with an average of 6.3 cents per pound for improved varieties; and between 2.7 to 4.2 with an average of 3.6 cents per pound for native/seedling varieties. Comparing Table ES1 and Table ES3 to Table ES4, it is apparent that the benefits of generic promotion outweigh the costs to growers.

C. Effectiveness on Stimulating Demand Through Increased Quality Standards. One of the authorities of the Council in the FMO (986.69) is the authority to make improvements in product handling. Specifically increasing the quality of pecans (freshness, safety, grade, size, packaging, etc.) delivered into the market can stimulate demand and increase prices. If the Council is able to establish minimum quality standards for handling in the future for pecans, this can lead to a relatively more inelastic demand and more consumer confidence in the product, which will lead to higher prices to growers. The cost of implementing product handling improvements has always been low compared to the benefits to growers. This would be illustrated by the case of pistachios where Alston et al. (2005) show that improving quality assurance in the pistachios resulted in a benefit to cost ratio of at least 5:1.

D. Costs and Benefits Across Various Farm Sizes.

Table ES5: Cost and Benefits by Farm Size of the Proposed FMO From Promotion

	Small	Medium	Large
Production (lbs)	49,980	291,667	833,333
Production assumes a 78% improved variety and 22% native/seedling split in acreage			
Cost of FMO	$1,140	$6,650	$19,000
*Assessment per pound * pounds produced = cost of FMO*			
Benefits of FMO	$2,853	$16,643	$47,550
*Average price increase per pound * pounds produced = benefits of FMO*			

Shown for 30 acres, 175 acres and 500 acres at 1666.67 lbs of inshell pecans per acre (average yield per acre over all three regions), as representative for small, medium and large farms in the production area.

With the cost and benefits per pound described in Table ES3 and Table ES4, we have estimated the costs and benefits of the FMO promotion authority by farm size as shown in Table ES5. In all cases the benefits of the FMO outweigh the costs across a range of farm sizes. The cost of FMO is calculated at the average as total pounds times the cost. For example, in the medium farm size of the total 291,667 lbs, 227,500 lbs are in improved variety (291,667 * 0.78) at an average cost of $0.025 we obtain a cost of $5,688 in improved varieties. The production of native/seedling is 64,167 lbs (291,667 * 0.22) at an average cost of $0.015 we obtain $963. The total costs then is the sum of the cost for improved varieties of $5,688 and native/seedling of $963 for a total of $6,650. The benefit is calculated using the total number of pounds times the estimated average increase in price. For improved varieties, 227,500 lbs times the average price increase of $0.063 we obtain $14,333 and for native/seedling we have 64,167 lbs for benefits of $2,310. Total benefits are the sum of benefits of improved varieties and native/seedling ($14,333

+ $2,310) for a total of $16,643. The benefit Cost Ratio (BCR) is simply the additional benefits generated by the program per dollar of cost. Dividing the estimated benefits by the cost we obtain 2.5 which means a $1 cost results in $2.5 dollars of benefits.

The range of benefits for a medium size farms using the low scenario is $10,833 to a high scenario of $24,535. The associated range of the costs for the medium size farm is $5,192 and $8,108 respectively. For a small farm, the costs are in the range of $890 (low scenario) to $1390 (high scenario) with benefits of $1,857 to 4,206 for the low and high scenario respectively. For a large farm, the costs are in the range of $14,833 to $23,167 for the low and high scenario and the benefits of $30,950 to $70,100 for the low and high scenario. In all cases the benefits outweigh the cost. The BCR ranges from 2.08 in the low scenario to 3.02 in the high scenario.

The model for estimating the stochastic prices is more complicated but this is a simple representation of the costs and benefits by farm size.

E. Minimum Size of Farm/Crop for Commercial Growers as used in the FMO. The full input costs for an acre of pecans across the production area requires a certain minimum land size or minimum annual production to be maintained in order for the farm to be economically viable over a period of four years. Failure to have a farm of a certain size or with yields above a certain size would result in either an economically unprofitable farm operation or would require a grower to reduce the necessary inputs on the farm to grow quality pecans over a period of time (reduced watering, moving, spraying, fertilizing, hedging, pruning or other inputs normally required by commercial pecan producers).

We believe, it is highly unlikely, even remote, that a pecan grower can be financially viable over a period of four years (Representative Period, as used in the FMO) if the grower is averaging less than 50,000 lbs of pecans per year over that period, and is applying all inputs associated with a commercial pecan grower. Said another way, pecan farmers growing less than 50,000 lbs of pecans on average per year are hobby farmers, experimental farmers, farmers not intending to make a profit or farmers not intending to maintain their farm with the normal inputs of a commercial pecan farmer. We used a yield of 1,666.67 inshell pounds an acre over 30 acres, which is the average yield across the production area calculated by the Proponent Group with input from Dr. Lenny Wells, University of Georgia Pecan Research Scientist.

F. Handler Considerations: Costs and Benefits.

Table ES6: Estimate of Typical Handler Margin

	2012	2013	2014
Improved pecans	$0.575	$0.575	$0.575
Native/seedling	$0.575	$0.575	$0.575

Table ES7: Cost Estimate of Average Handler Price Received

	2012	2013	2014
Improved pecans	$2.31	$2.48	$2.70
Native/seedling	$1.46	$1.50	$1.46

Source: Table ES2 plus Table ES6

Table ES8: Cost as Percentage of U.S. Estimated Pecan Handler Price

	2012	2013	2014
Improved	1.08%	1.01%	0.93%
Native/seedling	1.03%	1.00%	1.03%

Source: Assessment midpoint and estimated the minimum record keeping costs divided by prices shown in Table ES7

The benefits to the handlers outweigh the costs of implementing the FMO. It is evident at the handler level, there is the same magnitude of positive price change as there is with the grower analysis (Table ES4), but a smaller proportion of cost due to the greater prices paid to handlers (Table ES8 as compared to Table ES3).

G. Parity. The anticipated increases in pecan prices from promotion and handling authorities in the FMO should cause pecan prices to move towards parity pricing (as stated by the USDA to be $5.11 per inshell lb for 2014) but the implemented FMO should not cause pecan prices to be anywhere near equal to or exceeding pecan parity prices.

H. Better Information Will Benefit Growers, Handlers and Consumers. The pecan market today is inefficient, in part because of the lack of reliable, timely data on the domestic pecan crop. Most data on the pecan industry at this time is gathered voluntarily. The FMO proposes handler reports to the Council and requires the Council to make crop reports to the USDA at least yearly. These reports should provide all parties with more reliable product data. Increased confidence in the data on pecans should benefit all participants (growers, handlers and consumers) and lead to more accurate product pricing, and better information regarding product supply and demand.

[Will be attached at the end of the Report]

Selected Generic Commodity Promotion Studies

COMMODITY	STUDY	BENEFIT-COST RATIO		PROMOTION ELASTICITY*	
		average $ earned per $ spent on promotion		% demand change from a 1% expend. change	
ALMONDS	Crespi and Sexton (2005)		6.2b		0.13
COTTON	Williams et al. (2011)	Producer	5.7	Retail	0.05
		Importer	14.4	Mill	0.03
DAIRY	USDA (2012)	All Dairy	3.05		0.078
		Fluid milk	2.14		0.071
		Cheese	4.26		0.033
		Butter	9.63		0.042
		Exports	5.12		0.066
DRIED PLUMS	Alston et al. (1998)		2.7b		0.05
EGGS	Schmit and Kaiser (1998)		0.54-6.33a		0.006
HASS AVOCADOS	Carman, Li, and Sexton (2009)		2.5-4.0a		0.148-0.372a
HIGHBUSH BLUEBERRIES	Kaiser (2010)		9.12		0.109
HONEY	Ward (2008)		6.02-7.91a		0.082
MEAT:					
BEEF	Kaiser (2014)		11.2		17.4
PORK	Kaiser (2012)		14.44		0.018
LAMB	Ghosh and Williams (2014)		0.006-0.046d		0.037
MUSHROOMS	Richards (2011)	Retail	9.4-18.3e		0.008-0.089e
		Food Ser.	1.41-5.35e		0.039-0.058e
ORANGE JUICE	Williams et al. (2004)		2.9-7.0a		0.127-0.428a
POTATOES	Richards and Kaiser (2012)		5.17		0.32-0.116e
RAISINS	Kaiser, Liu, and Consignado (2003)		5.1-15.3a		0.029-0.133a
RICE	Rusmevichientong Kaiser (2009)		6.21-14.48a		0.21
SORGHUM	Capps, Williams, Málaga (2013)	Food/ind.	8.48		0.046-0.048a
		Exports	-0.144c		-0.33-0.066c, e
SOYBEANS	Williams, Capps, and Lee (2014)		6.5		0.023-0.047e
STRAWBERRIES	Carter et al. (2005)		44.0b		0.16
TABLE GRAPES	Alston et al. (1998)		44.9		0.16
WALNUTS	Kaiser (2005)		1.65-9.72a		0.005
WATERMELON	Kaiser (2012)		27.73		0.098b
WHEAT	Kaiser (2010)	Exports	9.51-20.00a		0.295-0.412a
MEDIAN			6.5		0.049
MEAN			9.8		0.093

* INCLUDES BOTH DOMESTIC AND EXPORT DEMAND PROMOTION ELASTICITIES.

A DEPENDING ON THE MODEL USED OR ELASTICITIES ASSUMED. B MARGINAL BCR . C NOT STATISTICALLY DIFFERENT FROM ZERO.

D LONG-RUN AND DEPENDING ON THE MARKET SEGMENT E. DEPENDING ON MARKET SEGMENT AND/OR PROGRAM TYPE

Source: Williams and Welch, An Economic Analysis of the Potential Returns from an Enhanced Wheat Checkoff Program (2014); table 2, p. 45.