Manufacturer Perceptions of U.S. Peanuts – Results of a Recent Survey

Lisa House[1], Ronald Ward[2], Julie Johnson[3], and Marshall Lamb[4]

Authors are
Associate Professor[1], Professor[2] and M.S. Graduate[3], respectively,
Food and Resource Economics Department
IFAS, University of Florida
P.O. Box 110240, Gainesville, FL 32611-0240
and
Research Leader, National Peanut Research Laboratory
Dawson, GA 39842-0509

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Abstract: In 2002, a new farm bill radically changed the U.S. peanut industry by eliminating the marketing quota system, requiring the industry to adjust to a more uncertain, market-oriented environment. This paper reports results from a survey of peanut manufacturers in nine countries identifying their peanut import habits and preferences.

Introduction

The 2002 Farm Security Act made monumental changes to the peanut program. This act eliminated the marketing quota system, which had existed in some form since the 1930's, changing the structure of the peanut industry. The marketing quota system was replaced with a set of supports similar to those of other crops. The changes reduced revenue and price stability and forced the peanut industry to become more market-oriented (Dohlman, Hoffman & Young 2003). "The key provisions comprise fixed decoupled payments, counter cyclical payments, and a marketing loan program" (Chvosta, Thurman, Brown & Rucker 2002). The act terminated the poundage quota.

Under the 2002 Farm Bill, all peanut producers, former quota holders and not, are eligible to market their peanuts for domestic edible consumption. All peanut producers are also eligible for marketing assistance loans at a rate of $355 per ton. Producers who were formerly quota producers are also eligible for direct payments of $36 per ton and counter-cyclical payments when prices are below $495 per ton. The producers who are eligible for direct payments and counter-cyclical payments are not required to produce peanuts to receive the payments. They are only required to keep the land in approved agricultural uses. Quota holders

were also eligible for a quota buyout in the amount of $1,100 per short ton (Dohlman, Hoffman, & Young 2003).

Because of the 2002 Farm Bill, the peanut industry has become more market-oriented. Since 2002 peanut producers have seen large losses in revenue, and there has been a rapid exit of peanut producers. In 2003, the value of peanut production fell by 30 percent and prices fell by 25 percent, compared with 2001. Planted acreage in the U.S. reached the lowest level since 1915.

The four largest peanut producing countries over the past 10 years have been China, India, Nigeria and the United States, generally in that order (FAOStat). Table 1 shows production quantities for these countries, along with others important to the U.S. peanut industry, for the years 1999 through 2005. The largest peanut exporters are China, Argentina, India and the U.S. Though Nigeria is the third largest producer, the country exports very few peanuts. The American Peanut Council (APC) is the trade association that represents all segments of the peanut industry.

As a result of the changes to the Farm Bill, peanut producers have had to learn more about consumer demands for their products. The American Peanut Council has as its objective to increase exports of all types of U.S. peanuts and peanut products. In accordance with this goal, the APC sponsored a survey of peanut manufacturers in nine countries outside the United States was conducted to identify their peanut import habits and preferences. The countries were chosen to represent the world market for U.S. peanut exports, summarized in Table 2.

The objective of this paper is to analyze that survey data to better understand the perception of U.S. peanuts by manufacturers in other countries and to determine, through the use of econometrics, the determinants of the U.S. share of peanut imports for manufacturers.

Data and Methods:

The data for this study was obtained through telephone interviews of manufacturers who use peanuts in nine different countries. The survey was conducted by three private market research firms from October 2005 – April 2006. In total, 57 participants responded, with the majority of respondents from Mexico, Canada, and the UK, in part due to a second effort targeting Mexico and Canada. The remaining surveys come from countries in the European Union and Scandinavia. Manufacturers surveyed spanned different size categories, with 13 respondents in the smallest category (under 1,000 tons purchased) and 4 purchasing over 25,000 tons of peanuts in a typical year. Respondents were asked to identify what the peanuts purchased were used for (snack kernel, peanut butter, confectionary, or in-shell production). These results also showed a broad spectrum was sampled, and that responses per country differed. Most respondents, 81% (46 respondents), purchased for snack kernel peanuts, including 23 respondents who only purchased for snack kernel; while only 7 respondents purchased peanuts for confectionary. The other categories were in-shell and peanut butter, which 21 and 12 respondents, respectively, purchased for.

Respondents also identified what countries they currently imported peanuts from. It should be noted that 7 responses from Mexico, 2 from the UK, and 1 from Canada had to be

removed from this portion of the survey due to mistakes gathering the data. The remaining 47 responses are reported in Table 3. Of those that responded, all but two currently purchase peanuts from the United States. The two that did not were both from Canada and purchased 100% of their peanuts from China.

Before beginning a sequence of questions about quality, respondents were asked to define what quality meant to them. Answers to the question varied, though some answers appeared consistently. Flavor or taste appeared in 68% (39) of the responses; consistency or uniformity and aflatoxin levels each appeared in 37% (21) of the responses; free of foreign material or clean in 35% (20) of the responses; and color and size appeared in 33% and 32% of the responses, respectively. Next, respondents were asked to rank the countries they imported from (plus the United States if not already included) in terms of quality (Table 4). The United States was ranked first 47 out of 56 times. Nicaragua was ranked first 5 times, followed by China twice and Argentina once. One respondent, who purchased 100% of their peanuts from China did not answer the question, indicating the only factor in purchasing was price, not quality. This respondent was a purchasing agent for a Canadian company that produced 100% snack kernels.

Immediately following the quality ranking, respondents were asked to rank countries in terms of price (Table 5) and Value (Table 6). China and the United States were ranked first in terms of price, while the United States was ranked first 38 times for value, followed by China with 7 first rankings. Respondents who ranked China first for value purchased 20 – 100% of their peanuts from China. The respondents that ranked China first included Canada (4), the UK

(2), and Spain (1). Nicaragua was ranked first for quality, price, and value 5 times by different respondents (only 1 respondent ranked Nicaragua first in all 3 categories).

Finally, respondents were asked to identify what made peanuts from the best country best, and the worst country worst. Results were similar to descriptions of what quality meant to the respondent. In total, 35 of 57 respondents mentioned characteristics of the peanuts, such as texture, flavor, and size, as factors that made peanuts from the best country the best. Another 14 respondents mentioned consistency or reliability as a major factor. Finally, low levels of aflatoxin and foreign material were mentioned by 12 respondents.

Model and Results:

The distribution of the data for the dependent variable, what percentage of peanuts were purchased from the U.S., includes a wide range of answers from 0% to 100%, with a relatively large number of responses at 100% (Figure 1). Due to the distribution of the dependant variable, a simple linear regression model cannot be used to model the data. Instead, a probit model is used to examine the choice between purchasing 100% of peanuts from the United States and purchasing anything less than 100% of peanuts from the United States. Next, a linear regression model is used on the portion of the respondents who purchased only a portion of the peanuts from the United States. It is hypothesized that a firm that purchases all peanuts from the United States is making their decision based on a different reasons than a firm that sources their peanuts from multiple countries.

Independent variables included size of manufacturing firm, type of manufacturer (snack, peanut butter, confectionary or in-shell), and the factor the manufacturer identified as the most important factor in making an import decision. The size of the firm was broken into four categories: less than 1,000 tons (TONS1); 1,000-5,000 tons (TONS2); 5,000-10,000 tons (TONS3); and more than 10,000 tons (TONS4). Dummy variables were created for the firm size categories. Type of production was also included as a set of dummy variables, including four categories: snack kernel, peanut butter, in-shell and confectionary. Processors who produced snack peanuts were broken into three categories: those who purchased zero peanuts for snack (SNACKNO), those who purchased between 0 and 100% for snack (SNACKSOME) and those who purchased peanuts only for snack (SNACK100). The remaining categories were separated into two categories: imported peanuts for peanut butter (PB), in-shell (IN), or confectionary (CONF), or did not import for peanut butter (NOPB), in-shell (NOIN), or confectionary (NOCONF). The independent variable representing what factors about peanuts buyers considered important comes from a qualitative survey question where respondents were asked what the *most* important factor was when choosing from where to buy peanuts. Information from this question was broken into five categories: price (PRICE), safety (SAFE), properties (PROP), consistency (CONS) and other (OTH). It can be noted that quality is not on the list. The reason for this is that there was an earlier question where buyers were asked what quality meant to them. Since respondents had many different perceptions of quality, some saying price, others safety, etc., it would not have been correctly explained to just say that quality was most important. Instead answers for what quality meant were inserted into the question of what was

most important anytime the respondent said quality. Safety included responses such as decreased foreign matter or low aflatoxin levels. Properties included responses such as taste, flavor and moisture levels. Consistency included responses about needing peanuts to be similar to make production easier. Other included responses that did not fit into the previous categories, such as customer demand, reliable shipping and longer shelf life.

Using dummy variables can cause what is known as the dummy variable trap. If this is not accounted for, dummy variables are likely to cause collinearity, meaning linear relationships among the variables (Gujarati 2003). We account for this by putting in one fewer dummy variable than there are in its category. There are two basic approaches for solving this issue: dropping one variable and the averaging method. The method chosen will dictate how the results are interpreted. If we drop one variable, significance in the model is against the dropped variable. For example, for the question on firm size, if we drop the last variable, firms using more than 10,000 tons of peanuts, significance of all other variables will be against those firms. Therefore, if we find that the coefficient for the smallest firm size is significant, that means that it is significantly different from largest firms. It is not always helpful to compare all variables to a dropped variable.

With the averaging method, we take the average of the firm. The average now becomes the benchmark so if we say that small firm size is significant, it is significantly different from the average. Because of the convenience in interpreting the results, this method was chosen.

The method for taking the average of the firm is to subtract the last variable in the group from each of the previous variables. This will cause the last variable to drop off so that we now have one fewer variable. For example, for country of the firm we have:

AVGTONS1 = TONS1 – TONS4

AVGTONS2 = TONS2 – TONS4

AVGTONS3 = TONS3 – TONS4

AVGTONS4 (dropped from the model) = TONS4– TONS4= 0

We see that the last dummy category always equals zero, so it drops out of the model and we are left with only 3 variables for country. The same method is used for averaging each of the other dummy variable categories. Using this method, t-statistics indicating if each category is significantly different from each other category are calculated with the following formula:

$$t = \frac{estimator - parameter}{error} = \frac{(\hat{\beta}_2 - \beta_2)\sqrt{\sum x_i^2}}{\hat{\sigma}}$$

These methods result in the following model:

US SHARE = *f*[CONSTANT, AVGTONS1, AVGTONS2, AVGTONS3, AVGSNACKNO, AVGSNACKSOME, AVGPB, AVGIN, AVGCONF, AVGPRICE, AVGSAFE, AVGPROP, AVGCONS]

With US SHARE = 1 if the company purchased 100% of their peanuts from the United States.

Results

Prior to running the linear regression models, probit models were examined to determine if the decision to purchase 100% of peanuts from the U.S. was based on different criteria than the decision to purchase only a portion from the U.S. The inverse mills ratio was then included in the linear regression model. As the IMR was not significant, the results reported in this paper are from the model without the IMR included, and the results from the probit test are not reported. For the industry, the more interesting question is what makes a firm choose to purchase more peanuts from the United States if they are sourcing from multiple countries. The results from the regression model are shown in Table 7. The t-statistics indicating significance between variables with multiple categories (size of firm and most important factor) are shown in Tables 8 and 9.

Firms that purchased less than 1,000 tons of their peanuts from the United States were significantly likely to purchase a smaller share of peanuts from the United States than firms that purchase between 1,000 and 10,000 tons of peanuts. Perhaps more importantly for the industry, the respondent's stated most important factor in purchasing peanuts influenced how much they were likely to purchase from the United States. Firms that indicated price was the most important reason for selecting where to purchase peanuts were significantly likely to purchase a smaller share than firms indicating safety is the most important reason. This is expected as the United States was given high ratings on safety and quality by the respondents, but the lowest ratings on price. Therefore, a firm to whom price is most important will be expected to purchase less from the U.S. and this is verified by the results of the econometric model.

Firms that indicated safety was the most important reason to decide where to purchase peanuts from were likely to purchase a larger share of peanuts from the United States than firms

that indicated price, peanut properties, or consistency as the most important reason. This indicates that firms that value safety (as defined by low levels of foreign matter and low levels of aflatoxin) are likely to purchase a higher percent share of peanuts from the United States. Finally, those that indicated the most important factor was consistency were likely to purchase a larger share from the U.S. than firms that indicated the peanut properties were the most important factors.

The final use for the peanuts also influence the percent share of U.S. peanuts purchased by the firm. Firms that did use peanuts for confectionary or in-shell products were likely to purchase higher shares than those who did not use peanuts for these products. Firms that do not purchase any peanuts for use as snack peanuts were likely to purchase a lower share from the United States than other firms.

Conclusions

Results from a survey of peanut manufacturing firms outside the United States provide a favorable picture of U.S. peanuts. Firms identified the U.S. as producing the highest quality peanuts, though noted they did not have the best prices. As the industry is forced to become more competitive, it is useful to understand what drives their customers to decide how much of their peanuts they will purchase from the U.S. over other countries. By examining the firms that purchased from multiple countries, we were able to provide some insight to this question. Consistent with the idea that U.S. peanuts are perceived to have high quality, firms that indicated safety was the most important purchase factor were likely to purchase a higher share of peanuts from the U.S. than firms indicating consistency, price or peanut properties as the most important

reason. Additionally, firms that indicated consistency was important purchased higher shares from the U.S. than firms indicating peanut properties were most important. This is good news to the U.S. industry, as they can continue to target firms that value safety and consistency. Interestingly, both safety and consistency was more valuable a trait to the U.S. peanut industry than peanut properties (such as taste, flavor and moisture levels). This should provide input to characteristics to focus on in marketing and product development for the industry.

Finally, the U.S. peanut industry (and American Peanut Council who sponsored this survey) can have the greatest impact by targeting peanut manufacturing firms that produce snack peanuts, confectionary products, or in-shell products. Those producing peanut butter were not likely to buy a larger share of peanuts from the United States.

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Table 1. Peanut production

	Quantity of Groundnuts (1000 tons)						
	1999	2000	2001	2002	2003	2004	2005
Argentina	486	599	564	517	316	419	593
Brazil	179	184	202	195	188	226	292
China	12,706	14,516	14,472	14,895	13,493	14,410	14,409
India	5,258	6,480	7,200	4,363	8,333	7,000	5,900
Mexico	132	142	120	75	75	75	
Nicaragua	68	68	81	60	94	104	
South Africa	163	136	222	134	67	128	
U.S.	1,737	1,481	1,940	1,506	1,880	1,945	2,113
Nigeria	2,894	2,901	2,683	2,699	2,797	2,937	2,937

Note: Information was not available for Mexico, Nicaragua and South Africa for 2005

Note: Information obtained from FAO websites:
http://www.fao.org/es/ess/top/commodity.html?lang=en&item=242&year=2005
and http://faostat.fao.org/site/340/DesktopDefault.aspx?PageID=340

Table 2. U.S. peanut exports

	Quantity in Tons					
Partner	1999	2000	2001	2002	2003	2004
World	223311	272815	178869	272558	164320	213632
Canada	70424	76247	63349	75030	61978	74551
Mexico	31980	42011	20733	29215	15832	29274
France	5108	3634	1571	6218	2902	4247
Germany	3970	6083	6002	10309	1602	1854
Spain	9066	9046	7470	8662	6550	7267
U.K.	24355	26434	15037	27462	14575	19957
Italy	2437	3415	1167	9189	959	1576

Note: Information obtained from the American Peanut Council Website:
http://admin.peanutsusa.com/documents/Document_Library/Peanut%20Product%20Exports.pdf

Table 3. Country of Origin for Peanuts Currently Purchased.

	Frequencies								
Percent	Argentina	Brazil	China	India	Mexico	Nicaragua	South Africa	United States	Other
0%	30	37	21	41	43	35	40	2	43
25% or less (>0%)	8	6	11	2	0	8	2	5	0
26 – 50%	5	0	8	0	0	1	1	8	1
51 – 99%	1	0	1	0	0	0	0	14	0
100%	0	0	2	0	0	0	0	18	0

Table 4. Ranking of Country of Origin for Quality.

Rank	Argentina	Brazil	China	India	Mexico	Nicaragua	South Africa	U.S.
1	1	0	2	0	0	5	0	47
2	9	1	14	0	0	7	1	5
3	3	3	10	0	0	1	2	2
4	3	2	4	1	0	1	0	0
5	3	1	0	1	0	0	0	1

Table 5. Ranking of Country of Origin for Price.

Rank	Argentina	Brazil	China	India	Mexico	Nicaragua	South Africa	U.S.
1	3	1	21	0	0	5	2	21
2	9	4	3	1	0	3	1	14
3	3	0	3	0	0	2	0	11
4	2	0	2	0	0	2	0	3
5	0	0	0	1	0	0	0	3

Table 6. Ranking of Country of Origin for Value.

Rank	Argentina	Brazil	China	India	Mexico	Nicaragua	South Africa	U.S.
1	3	0	7	0	0	5	1	38
2	6	3	15	0	0	2	2	7
3	3	1	6	0	0	5	0	5
4	3	1	3	1	0	0	0	2
5	3	1	0	1	0	0	0	0

Table 7. Results from Linear Regression Model of Share of Imported Peanuts from the U.S.

Variable	Coefficient	Standard Error
Constant	0.750***	0.088
AVGTONS1	-0.109	0.169
AVGTONS2	-0.114	0.101
AVGTONS3	0.152*	0.072
AVGSNACKNO	0.337***	0.107
AVGSNACKSOME	-0.387***	0.119
AVGPB	0.004	0.061
AVGIN	-0.227**	0.092
AVGCONF	-0.160**	0.065
AVGPRICE	-0.123*	0.061
AVGSAFE	0.040	0.058
AVGPROP	0.130	0.114
AVGCONS	-0.184	0.153

where *, **, and *** = significance at the 90%, 95%, and 99% levels.

Table 8. T-values for size of the firm

	Covariance Matrix for Size of the Firm (tons of peanuts)			
	Under 1,000	1,000 to 5,000	5,000 to 10,000	More than 10,000
Under 1,000		-2.613**	-1.748*	-0.434
1,000 to 5,000	-2.613**		-0.732	0.468
5,000 to 10,000	-1.748*	-0.732		0.745
More than 10,000	-0.434	0.468	0.745	

where *, **, and *** = significance at the 90%, 95%, and 99% levels.

Table 9. T-values for what is considered important

	Covariance Matrix for What is Considered Important				
	Price	Safety	Properties	Consistency	Other
Price		-2.613**	1.076	-1.134	-1.234
Safety	-2.613**		3.620***	3.996***	0.408
Properties	1.076	3.620***		-3.020***	-2.233**
Consistency	-1.134	3.996***	-3.020***		-0.893
Other	-1.234	0.408	-2.233**	-0.893	

where *, **, and *** = significance at the 90%, 95%, and 99% levels.

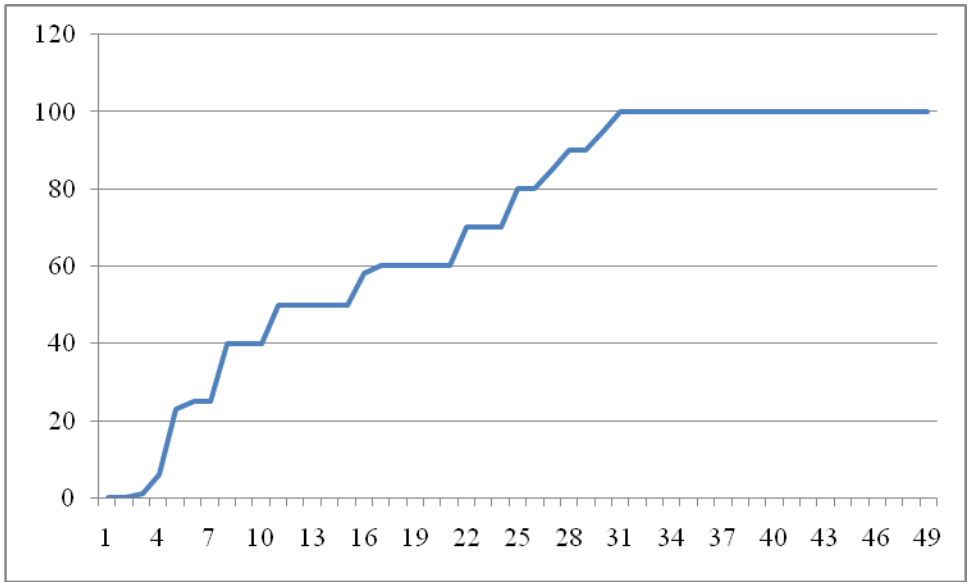

Figure 1. Dependant variable: Share of Peanuts Purchased from the United States.