The Competitive Position of Peanuts: A Comparison Between the U.S. and China[1]

Changping Chen*, Stanley M. Fletcher, Ping Zhang, and Dale H. Carley[2]

ABSTRACT

This study analyzed the competitiveness of peanuts for the U.S. and China over the 1988-93 period. Economic cost, cost components, yield, and net returns were examined using the Mann-Whitney test. Results indicate that net returns to farm management and risk in peanut production were substantially lower in both the domestic and world markets for American peanut producers than for Chinese peanut producers due to higher economic cost in American peanut production. American peanuts were less competitive than Chinese peanuts in terms of costs and net returns. Findings suggest that reducing costs and improving economic efficiency of production should be the most important priority for the U.S. peanut industry as the world moves toward freer trade. The future competitiveness of U.S. peanuts not only depends on its high quality, but also depends on its relative price in the domestic and international markets.

Key Words: Economic cost, net returns, *Arachis hypogaea*, groundnut.

Trade liberalization and the domestic debate on the peanut program during the 1995 Farm Bill symbolized that the U.S. peanut industry is entering a new era characterized as a more open market economy. The changes associated with the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT) open more potential foreign markets for U.S. peanuts, but the changes also expose the U.S. domestic peanut market to increasing foreign competition. Peanut exports are important to American peanut growers because the U.S. exports about 20% of its production, or over 800 million pounds (USDA, 1995b), with a value of about $200 million in the 1990s (Sanford and Evans, 1995). In the world market, the U.S., China, and Argentina are major peanut exporters. The market share of peanut export in the world market averaged about 28% for the U.S., 25% for China, and 10% for Argentina for the 1980-94 period. As U.S. peanut export rivals, both Argentina and China have been gaining market share in recent years. While the U.S. has been a leading peanut exporter historically, its market share was below China's for the 1993-94 period (USDA, 1995b). Although China is neither a member of NAFTA or GATT nor a member of the World Trade Organization (WTO) (a successor of GATT), it does have Most Favorite Nation (MFN) status with the U.S. This allows Chinese peanuts to enter the U.S. market at the GATT tariff rate rather than at higher tariff levels.

In a dynamic global economy, a concern exists about the competitive position of U.S. peanuts in the world market. As China approaches nearly one-third of the world market share, it is questionable whether China's peanut industry will become more competitive with the U.S. or whether Chinese peanuts may enter the U.S. domestic market at all. To grasp the opportunities and meet the challenges presented by trade liberalization and the domestic farm program reform, there is a critical need for reliable and understandable information on the competitiveness of U.S. peanuts relative to China. The effects of economic cost, government interventions, and other factors on the competitive position of U.S. peanut industry in both domestic and international markets should be understood.

Competitiveness of agricultural commodities is a complex issue and not well defined in economic and trade theory. Competitiveness is often considered as a matter of long-term survival (Thurow, 1992) or the ability to maintain or increase market share through a sustained period of time (Larson and Rask, 1992). For a country, competitiveness under free trade is the ability to sell goods at the ongoing price in the international market with no subsidies while maintaining or even gaining market share (Duren *et al.*, 1991; Thurow, 1992). Economists use various criteria to evaluate competitiveness across regions or countries since there is no standard theory for assessing the competitive position of commodities. The approaches used most often in competitiveness analyses include export supply analysis (Sharples and Milham, 1990), production indices such as the growth of labor and land productivity (Polopolus, 1986; Sumner, 1986), and cost comparisons (Andrew and Ethridge, 1987; Le Stum and Camaret, 1990). Cost of production is a leading indicator of competitiveness (Ahearn *et al.*, 1990; Capalbo *et al.*, 1990; Sharples, 1990). Low costs and maintaining profits are essential for a firm to stay in business in a competitive market. Empirical studies in cost-competitiveness analysis have been conducted for several agricultural commodities such as wheat, cotton, and rice (Ahearn *et al.*, 1990; Capalbo *et al.*, 1990; Sharples, 1990), but little is known about the competitive position of U.S. peanuts in the world market because of the difficulty of obtaining information from foreign countries. The objective of this study is to assess and analyze the competitive position of peanuts in terms of economic costs, cost components, yield, and net returns to management and risk at both the domestic and international levels for the U.S. and China for the 1988-93 period.

While the competitive position of peanuts is determined by many factors including trade barriers, export subsidies, and resource endowments, net returns along with economic costs measure the competitiveness of a

[1]The study was supported by a grant from the Georgia Agric. Commodity Commission for Peanuts and State and Hatch funds allocated to Univ. of Georgia.

[2]Postdoc. Res. Assoc., Prof., former Postdoc. Res. Assoc., and Prof., respectively, Dept. of Agric. and Applied Econ., Univ. of Georgia, Griffin, GA 30223.

* Corresponding author.

commodity under a free trade market environment. Net returns to farm management and risks are defined as the difference of total production value minus total economic costs per hectare of land or per kilogram of product. Because American peanuts consist of quota and additional peanuts, economic costs are not equal between these two categories of peanuts. Quota peanuts are for domestic edible food use and subsidized by the government production management program. However, additional peanuts are free of government supply control and used for export edible food or crushing for oil and meal. A rent for quota peanuts exists since they are subsidized by the peanut program. Quota rent is an actual cash expense to nonquota owner producers and a noncash opportunity cost to quota owner producers. Because of this difference, quota rent is considered as a cost factor affecting the competitive position of American peanuts relative to imported peanuts in the U.S. domestic market while not a cost factor affecting the competitive position of American peanuts in the world market.

Methods and Data Considerations

Methods. Since competitiveness is a matter of long-term survival, knowing production costs and returns is essential to determine whether an industry can compete in a free trade market. The evaluation of the competitiveness for peanuts is to examine the factors such as cost, yield, and net returns to management and risk compared to other countries. The assessment of competitiveness in a free trade market place at a given point in time is to compare and contrast all these components which determine the competitive position for peanuts between the countries for a given time, place, and form of the product.

While the comparison of means between two populations can be accomplished by a t-test, the data from China permit only the use of a nonparametric statistical method, the Mann-Whitney test, to conduct the comparison between the two countries. This test requires no assumptions about normality from the sampled data. Furthermore, the test is statistically robust since it is based on the rank of observations from each sample. The hypothesis of the comparison can be formally written as:

$$H_0: \; E(X_{U.S.}) = E(X_{China})$$

$$H_1: \; E(X_{U.S.}) \neq E(X_{China}) \qquad \text{[Eq. 1]}$$

where X represents the factors determining the competitive position of peanuts for the two countries. The null hypothesis is that there is no significant difference for X between the U.S. and China during the study period. If there are no identical observations (i.e., no ties) or a few identical observations (i.e., a few ties), the Mann-Whitney test statistic equals the sum of the ranks assigned to the sample from the first population (i.e., the U.S.) as the following:

$$T = \Sigma R(X_{i,u.s}) \qquad \text{[Eq. 2]}$$

where R represents rank and i denotes the ith observation in the U.S. for X (Conover, 1980). If there are many ties, the formulation is modified by subtracting the mean from T and dividing by the standard deviation to obtain:

$$T_1 = \frac{T - n\frac{N+1}{2}}{\sqrt{\frac{nm}{N(N-1)}\sum_{i=1}^{n} R_i^2 - \frac{nm(N+1)^2}{4(N-1)}}} \qquad \text{[Eq. 3]}$$

where n is the sample size for the U.S., m is the sample size for China, $N = n + m$, and ΣR_i^2 is the sum of the squares of all N of the ranks or average ranks actually used in both samples. A comparison of T_1 with the corresponding value in a normal distribution table determines the level of significance (Conover, 1980). A comparison of the calculated T with the corresponding quantile of the tabulated Mann-Whitney test statistic concludes the hypothesis test.

Economic cost, yield, and net returns of peanut production were chosen as the factors to assess the competitive position of U.S. peanuts relative to China in both the domestic and world markets. Total economic costs were separated into comparable cost components such as seed, fertilizer, chemicals, labor, land value (i.e., land rent), and policy effects (i.e., quota rent). Since the information from China was not as detailed as the U.S.'s, there was no basis of comparison between the two countries for items such as taxes, insurance, and general farm overhead. Cost components that were not comparable were combined into a special category—other expenses. Seed expenses reflect the cost of peanut seed used per hectare. Fertilizer expenses measure the cost of fertilizers used for peanut production. Lime and gypsum are included in the fertilizer expenses. Chemicals consist of herbicides, insecticides, fungicides, and nematacides. Labor includes the labor paid and unpaid related to peanut production. The item of other expenses is a mixed category, which includes general farm overhead, custom operations, fuel, lubricants, electricity, drying, taxes, insurance, interest, etc. Yield measures how many kilograms of farmer stock peanuts are produced per hectare of land. Economic costs and net returns for the U.S. are examined under the assumption of without either quota rent, land value, or both quota rent and land value. While quota rent is included in the costs for assessing the competitiveness of U.S. peanut in the domestic market related to imports of Chinese peanuts, it is excluded in the U.S. costs for evaluating the competitiveness of American peanuts in the world market.

Land value and quota rent are treated as separate cost factors for the U.S. because China does not have the two cost items. Since cotton is the best alternative crop for peanuts, cotton land rent was used as a proxy for peanut land rent in the analysis for the U.S. in order to examine how the peanut program affects costs and returns through land. Quota rent does not exist for peanut production in China since China uses a "contract" system (semimandatory means) to control staple crop production such as grain, cotton, and oilseeds. No farm land market is available in China because land is not a private property in the centrally planned economy. In the current Chinese system, farm land belongs to local communities called Zhu (i.e, group). A Zhu is the lowest farm production unit and consists of 30 to 40 households in the rural area. Any growers in the group are eligible to farm a certain number of hectare. Farmers who use the land are, however, obligated to pay an agricultural tax in kind and sell a certain amount of their products to the state government at the regulated prices. Meanwhile, the government uses loans, fertilizers, and improved seeds as incentives to encourage more farmers to participate in gov-

ernment plans. Farmers can use the land, but they do not have the right to sell or rent it to anyone else. All the transactions between growers, group, and government are guaranteed by contracts.

Data Considerations. Data used in this analysis were collected from both government reports and primary surveys in the U.S. and China for the 1988-93 period. Information for the U.S. and Southeastern U.S. production region was obtained from the annual "Economic Indicators of the Farm Sector: Costs of Production" publication (USDA, 1992-93). Data for China and Shandong province were from China Agricultural Yearbook (China Agric. Press, 1988-91) and China Rural Statistics Yearbook (China Stat. Press, 1992-93) as well as a primary survey (for Shandong peanuts) from the Shandong Statistic Bureau. The Southeast (i.e., Georgia, Alabama, and Florida) was chosen as the region for analysis since it produced about 60% of U.S. peanut production during 1992-94 (USDA, 1995a). Shandong province was chosen as the region for China because it represents the major peanut-growing region with 31% of the production for China during the 1991-93 period (China Stat. Press, 1992-93). Furthermore, export peanuts were mainly produced in the Southeastern U.S. and in the Shandong province. Carley *et al.* (1992) found that Southeastern U.S. peanut production was the primary influence on world peanut price. Chinese peanuts traded in the world market (i.e., cv. Hsu-ji) were chiefly produced in Shandong. Six years of information (1988-93) were used in this study because 1993 was the most current and 1988 was the earliest year available for the primary data available from Shandong province.

Exchange rates used to convert monetary values between the countries were based on the International Financial Statistics Yearbook published by International Monetary Fund (1994). The conversion between hectare and mou, the Chinese measure of land area, was based on the conversion factors published in A New English-Chinese Dictionary (Shanghai Translation Press, 1986). Peanut price in Rotterdam was considered as the reference price for the world peanut market. The conversion from world shelled peanut price (i.e., the price in Rotterdam) to farmer stock peanut price was based on the procedures established by the U.S. International Trade Commission. The formula used to convert world shelled peanut price in Rotterdam to farmer stock peanut prices is as follows:

$$FSP = [\frac{P_R}{1000} - (Csc + Cs)](Rc)(R_h) \qquad \text{[Eq. 4]}$$

where FSP = Farm Stock Price ($/kg), P_R = price in Rotterdam ($/mt), C_{sc} = cost of shelling and culling ($/kg), C_s = cost of shipping ($/kg), R_c = rate of culling (%), and R_h = rate of hulling (%). For the U.S., C_{sc} = 0.2203, C_s = 0.0640, R_c = 88%, and R_h = 75%. The formulation was established by the U.S. International Trade Commission based on industry data. Since shelling and culling are performed primarily by manual means in China, adjustments were made for the cost of shelling and culling and for the rate of culling. Considering the manual harvest and inexpensive labor in China, it is reasonable to set C_{sc} = 0.1126, R_c = 97%, and the other conversion factors the same between the two countries.

Results and Discussion

Economic Costs. Economic costs per hectare in peanut production over the 1988-93 period averaged $1684 for the U.S. and $490 for China, but $1667 for the Southeast and $569 for Shandong province (Table 1). The difference of costs between the countries was statis-

Table 1. Comparison of economic costs and returns in peanut production for 1988-93.

Item	National comparison				Regional comparison			
	U.S.	China	Difference	Statistic[a]	Southeast	Shandong	Difference	Statistic[a]
	$/ha				$/ha			
Seed	192.65	113.47	79.09***	57	201.49	106.51	94.98***	57
Fertilizer	90.55	64.51	26.04***	57	95.30	115.77	-20.47	35
Chemicals	205.39	9.10	196.29***	57	227.90	26.17	201.82***	57
Labor	199.09	241.97	-42.88	39	181.46	231.08	-49.62	35
Other expenses	517.88	61.16	456.72***	57	474.79	89.65	385.14***	57
Subtotal	1205.47	490.21	715.27***	57	1181.03	569.17	611.86*	57
Land	196.09				184.61			
Quota	282.45				301.77			
Total[b]	1684.02	490.21	1193.81***	57	1667.42	569.17	1098.24***	57
Revenue ($/ha)	1684.01	824.90	859.11***	57	1697.22	1030.56	666.66***	57
Yield (kg/ha)	2574.96	2556.82	18.15	39	2618.13	3443.87	-825.74**	25

[a]Critical values for Mann Whitney test for the difference of means between the U.S. and China and between the Southeastern U.S. and Shandong province.

[b]The total of each column might not exactly equal the summation of that column because the value of rows were the average of 6 yr (1988-93).

,*Indicates significance at $P \leq 0.05$ and $P \leq 0.01$, respectively.

tically significant ($P \leq 0.01$) at both the national and regional levels. Higher economic costs for U.S. peanut production were partially attributable to quota rent and land value because these two items do not exist in China due to the Chinese centrally planned social system. Costs of seed, chemicals, and other expenses per hectare also were significantly larger for the U.S. than for China at both the national and regional levels. While the national average fertilizer expense was substantially higher for the U.S. than for China, there was no statistical evidence of a difference in fertilizer expense between the Southeast and Shandong.

Percentage distribution of cost components excluding quota and land rents shows that "other expenses" dominated economic costs (about 43%) for the U.S. and "labor expenses" dominated economic costs (about 50%) for China (Fig. 1). While the percentage distribution of cost components was slightly different between the national and regional levels in each country, "other expenses" still dominated the economic costs for the Southeastern U.S. and "labor expenses" amounted to about 41% of the total costs for Shandong (Fig. 2). Large "other expenses" for the U.S. were attributed to costs of using and maintaining peanut farming equipment such as costs

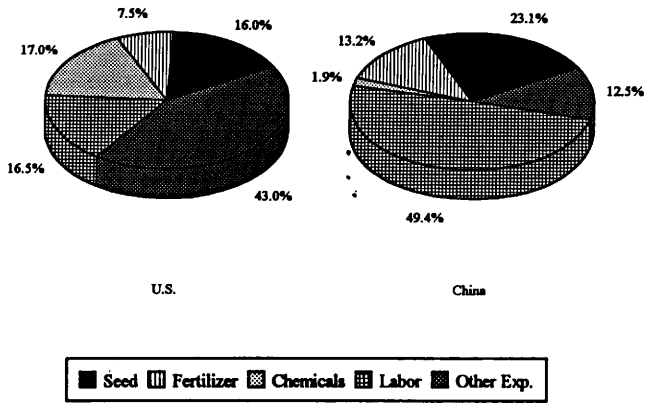

Fig. 1. Cost structure of peanut production for the U.S. and China (1988-93).

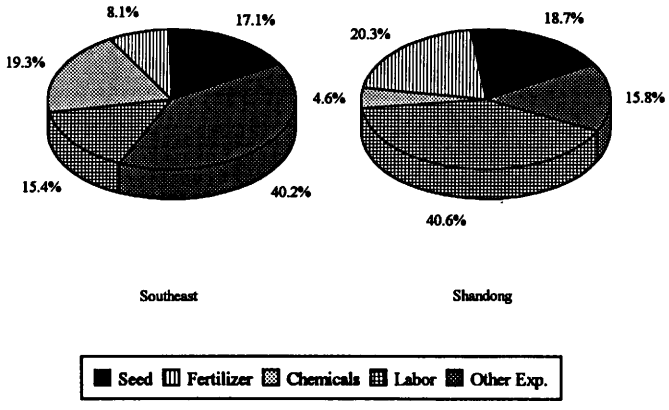

Fig. 2. Cost structure of peanut production for the Southeast and Shandong (1988-93).

of fuels, lubricants, electricity, repairs, and capital replacement. High labor costs for Chinese peanut production resulted from Chinese peanut producers using animal power to cultivate land because modern farming equipment like combines and drying facilities are not available. Low expenses of seed and chemicals for Chinese peanuts could be due to the abundant and relatively inexpensive labor since all the production process including peanut planting, pest and disease control, fertilizer uses, and harvest are performed manually.

While there was little difference in per hectare yield for peanuts between the U.S. and China, a significant difference was found between the Southeast and Shandong over the study period. Per hectare yield averaged about 2618 kg for the Southeast, but 3443 kg for Shandong (Table 1). A significant difference was still found in per hectare yield between the Southeast and Shandong even if the drought year (i.e., 1990) was dropped from the Southeast during the study period. This finding was not expected given the low cost of Chinese peanut production. High peanut yield for China could be due to the Chinese traditional intensive farming practices. The fact that cultivated land is less than 0.12 ha/capita and 0.24 ha/rural laborer for China (Coblby *et al.*, 1990) suggests that limited amounts of land forces farmers to use land in an extraordinarily intensive way.

High economic costs and similar or even lower yield per hectare for the U.S. resulted in high economic costs on a per-kilogram basis as compared to the costs in China. Even without quota rent and land-value expenses, economic costs per kilogram for peanuts were significantly higher for the U.S. than for China at both the national and regional levels (Table 2). Economic costs per kilogram in peanut production were slightly lower for the regional average than for the national average for both countries because both the Southeast and Shandong have favorable growing conditions for the crop.

Net Returns to Farm Management and Risk. Net returns to farm management and risk for peanuts were affected by quota rent and land value. If quota rent and land value were included in U.S. economic costs, net returns per hectare to farm management and risk in peanut production averaged about $335 less for the U.S. than for China and $432 less for the Southeast than for Shandong (Table 2). Negative net returns were observed for U.S. peanut production at the national average over the study period. If quota rent was not included in U.S. economic costs, there was no statistical difference in net returns per hectare at both the national and regional levels between the two countries.

With the substitution of cotton land rent as a proxy for peanut land rent in U.S. economic costs, net national average returns would increase approximately $56/ha and $93/ha for the Southeastern U.S., but there was still no statistical difference in per hectare returns between the two countries. This implies that American peanut producers would continue to pay nearly the same amount of land expenses to produce peanuts even if U.S. peanut program is abolished. However, if both quota rent and land value were excluded in U.S. economic costs, net

Table 2. Comparison of economic costs and returns in peanut production under different quota and land rent assumptions for 1988-93.

Item	National comparison				Regional comparison			
	U.S.	China	Difference	Statistic[a]	Southeast	Shandong	Difference	Statistic[a]
Production value								
Production value ($/ha)	1684.00	824.91	859.09***	57	1697.21	1020.69	676.52***	57
Production value (¢/kg)	65.82	32.50	33.32***	57	65.49	29.72	35.77***	57
Total costs (¢/kg)								
All[b]	66.22	19.34	46.88***	57	65.27	16.76	48.51***	57
No quota (with peanut land)[c]	55.09	19.34	35.75***	57	53.41	16.76	36.65***	57
No quota (with cotton land)[d]	52.90	19.34	33.56***	57	49.88	16.76	33.12***	57
No quota & land[e]	47.35	19.34	28.01***	57	46.26	16.76	29.50***	57
Net returns ($/ha)								
All[b]	-0.05	334.69	-334.74***	21	29.80	461.38	-431.58***	16
No quota (with peanut land)[c]	282.42	334.69	-52.27	41	331.58	461.38	-129.80	36
No quota (with cotton land)[d]	338.84	334.69	4.15	42	424.69	461.38	-36.69	37
No quota & land[e]	0.00	334.69	143.83*	50	516.20	461.38	54.81***	40
Net returns (¢/kg)								
All[b]	-0.40	13.16	-13.55***	21	0.23	12.96	-12.73***	23
No quota (with peanut land)[c]	10.74	13.16	-2.42	41	12.09	12.96	-0.87	37
No quota (with cotton land)[d]	12.92	13.16	-0.24	41	15.61	12.96	2.65	44
No quota & land[e]	18.46	13.16	5.29**	50	19.23	12.96	6.27*	50

[a]Critical values for Mann Whitney test for the mean difference between the U.S. and China and between the Southeastern U.S. and Shandong province.

[b]Both quota rent and peanut land value were included.

[c]Quota rent was excluded, but peanut land value was included.

[d]Quota rent was excluded, but cotton (instead of peanut) land value was included.

[e]Both quota rent and peanut land value were excluded.

*,**,***Indicates significance at $P \leq 0.10$, $P \leq 0.05$, and $P \leq 0.01$, respectively.

returns to farm management and risk were higher for U.S. than for Chinese peanuts. Net returns per kilogram follow a similar pattern as the net returns per hectare for peanut production between the two countries.

The significant difference of net returns in peanut production between the U.S. and China suggests that U.S. domestic quota peanuts were less competitive than Chinese peanuts under a free trade environment. If there was no import restriction on foreign peanuts, Chinese peanuts might enter the U.S. domestic market because Chinese peanuts have significantly lower economic costs and higher net returns than American peanuts at the farmgate. The impacts of quota and land rents on net returns indicate that both government intervention and the social system significantly affect the competitive position of peanuts in the domestic market.

Competitive Position of U.S. Peanuts in the World Market. World peanut price in Rotterdam averaged higher for the U.S. than for China. Prices reported by Public Ledger (1988-93) show that shelled peanuts (40/50 runner for the U.S. and Hsu-ji 40/50 for China) on the average was $1113.63/mt (i.e., 111¢/kg) for the U.S. and $901.08/mt (i.e., 90¢/kg) for China during the 1988-93 period (Table 3). The higher U.S. peanut price can be attributed to its higher quality and the reputation of U.S. peanuts and marketing services in the world market. While the world shelled peanut price was higher for the U.S. than for China, farmer stock peanut price converted from world shelled peanut price was approximately the same. The converted prices for farmer stock peanuts were 54.8¢/kg for the U.S. and 52.7¢/kg for China (Table 3). No statistical evidence was found for a difference in the converted farmer stock peanut prices between the two countries. This probably occurs because costs of shelling and culling were lower and the rate of culling was higher in China than the U.S. because both shelling and culling in China are typically performed manually.

Net returns to farm management and risk based on world peanut prices indicate a competitive disadvantage of the U.S. peanuts for export. In the Rotterdam market, negative net returns to farm management and risk are observed (-0.33¢/kg) at the national average for American peanuts, while net regional returns average only about 1.4¢/kg for the Southeast (Table 3). However, net returns were about 33.4¢/kg for China at the national level and 36¢/kg for Shandong province. The differences of net returns to management and risk was statistically significant ($P \leq 0.05$) between the two countries. If cotton land was used as a proxy for peanut land in U.S. economic costs, the differences of net returns remain statistically significant ($P \leq 0.05$) between the two countries at both the national and regional levels. Without

Table 3. Comparison of net return converted from shelled peanut price in Rotterdam under different land rent assumptions for 1988-93.

Item	National comparison				Regional comparison			
	U.S.	China	Difference	Statistic[a]	Southeast	Shandong	Difference	Statistic[a]
World peanut prices								
In Rotterdam (Shelled, $/mt)	1113.63	901.08	212.55***	57	1113.63	901.08	212.55***	57
At farmgate (¢/kg)	54.76	52.72	2.03	32	54.75	52.72	2.03	32
Costs (¢/kg)								
No quota (with peanut land)[b]	55.09	19.34	35.75***	57	53.41	16.76	36.65***	57
No quota (with cotton land)[c]	52.90	19.34	33.56***	57	49.88	16.76	33.12***	57
No quota & land[d]	47.35	19.34	28.01***	57	46.26	16.76	29.50***	57
Net return converted from Rotterdam price (¢/kg)								
No quota (with peanut land)[b]	-0.33	33.38	-33.71**	24	1.35	35.96	-34.62**	25
No quota (with cotton land)[c]	1.86	33.38	-31.52**	27	4.90	35.96	-31.07*	28
No quota & land[d]	7.40	33.38	-25.98	29	8.49	35.96	-27.47	29

[a]Critical values for Mann Whitney test for the mean difference between the U.S. and China and between the Southeastern U.S. and Shandong province.

[b]Quota rent was excluded, but peanut land value was included.

[c]Quota rent was excluded, but cotton (instead of peanut) land value was included.

[d]Both quota rent and peanut land value were excluded.

*,**,***Indicates significance at $P \leq 0.10$, $P \leq 0.05$, and $P \leq 0.01$, respectively.

both quota and land rents, there was no statistical evidence of differences in net returns to management and risk at either the national and regional levels even though there was a difference in magnitude. Lower returns for the U.S. relative to the Chinese peanut industry are due to its high "other costs" and land cost. Chinese peanut growers have no land costs and cheaper labor in peanut production. The differences in net returns based on the world peanut prices between the two countries suggest that American peanuts are not as competitive as Chinese peanuts in the world market. Given the high economic costs and low net returns for U.S. peanuts, one might question why the U.S. could maintain about 27% of the world market share by exporting about 20% of its total production. A possible explanation is that most peanut growers do not allocate appropriate expenses (e.g., farm equipment and other fixed expenses) to additional peanuts. Rather, the producers let the quota production carry those expenses. This implies that U.S. export peanuts are indirectly subsidized by the government program.

Summary and Conclusions

Competitiveness is a matter of long-term survival in the market place. Economic cost, yield, and net returns to management and risk in production are vital factors for an industry to compete in the world market under the new market environment created by increasing trade liberalizations and/or free trade. To evaluate the competitive position of U.S. peanuts in both domestic and world markets, this study analyzed economic cost, cost components, yield, and net returns of peanut production at both the national and regional level for the U.S. compared to its major export competitor—China. Results indicate that economic costs of producing peanuts and some cost components such as seed, fertilizer, chemicals, and other expenses were substantially higher for the U.S. than China. U.S. peanut production was capital intensive due to using and maintaining modern farm equipment. Chinese peanut production was labor intensive due to abundant and inexpensive labor sources and scarcity of capital. While labor dominated expenses with about 50% of the economic costs for China at the national average, no statistical evidence of a difference in labor costs was found between the two countries. Per hectare yield in peanut production was higher for Shandong than for the Southeastern region. Net returns to farm management and risk were significantly less for U.S. peanut growers than for Chinese peanut growers at both the national and regional levels based on domestic peanut prices. While shelled peanut price in Rotterdam averaged higher for the U.S. than for China because U.S. peanuts had higher quality, there was no significant difference for farmer stock peanut prices converted from world peanut prices. Net returns based on world peanut prices were significantly higher for China than for the U.S.

Findings from the analysis suggest that Chinese peanuts can enter the U.S. domestic market under a free trade environment given the low cost of Chinese peanuts. Further, U.S. peanuts are not as competitive as Chinese peanuts in terms of cost and return in the world market. The U.S. peanut industry has the competitive advantage over China's peanut industry in terms of infrastructure. China's peanut industry has the competitive advantage over the U.S. peanut industry in low economic costs due to no land expenses, no quota rent, and inexpensive labor. However, land as a resource is not a

problem for the U.S. peanut industry, but it is the major obstacle for China's agriculture because there are increasing conflicts for land among grain crops, oilseed crops, and industrial uses. Furthermore, the lack of a market force in China's farm land system implies a disadvantage for China because the system reduces the efficiency of land utilization. As the world moves toward more free trade, reducing costs and improving production economic efficiency should be the most important priority for the U.S. peanut industry because the competitiveness of U.S. peanuts not only depends on its high quality but also depends on its relative price in the international and domestic markets.

Literature Cited

Ahearn, M., D. Culver, and R. Schoney. 1990. Usefulness and limitations of COP estimates for evaluating international competitiveness of Canadian and U.S. wheat. Amer. J. Agric. Econ. 72:1283-91.

Andrew, P., and D. Ethridge. 1987. Comparative costs of producing cotton in major exporting countries. College of Agric. Sci., Texas Tech Univ., Publ. No. T-1-253, July.

Capalbo, S. M., D. Culver, and M. G. S. Denny. 1990. International comparisons of agricultural productivity: Development and usefulness. Amer. J. Agric. Econ. 72:1292-1297.

Carley, D. H., S. M. Fletcher, P. Zhang, and H. Witt. 1992. Relationship of Rotterdam peanut prices to U.S. peanut production. Peanut Sci. 19:108-110.

China Agric. Press. 1988-91. China Agricultural Yearbook. Beijing, China.

China Stat. Press. 1992-93. China Rural Statistical Yearbook. Beijing, China.

Colby, W. H., F. W. Crook, and S. H. Webb. 1949-90. Agricultural Statistics of the People's Republic of China. Econ. Res. Serv., USDA, Stat. Bull. No. 844.

Conover, W. J. 1980. Practical Nonparametric Statistics. 2nd Ed. John Wiley & Sons, New York, pp. 215-228.

Duren, E., L. Martin, and R. Westgren. 1991. Assessing the competitiveness of Canada's agrifood industry. Can. J. Agric. Econ. 39:727-738.

International Monetary Fund. 1994. International Financial Statistics Yearbook. Publ. Serv., IMF, Washington, DC.

Larson, D. W., and N. Rask. 1992. Industry note: Changing competitiveness in world soybean markets. Agribusiness 8:79-91.

Le Stum, H., and D. Camaret. 1990. European community experience in costs of producing wheat. Amer. J. Agric. Econ. 72:1298-1303.

Polopolus, L. C. 1986. The competitive position of southern commodities in international market: A synopsis. South. J. Agric. Econ. 18:75-78.

Public Ledger. 1988-93. Incorporating Commodity Week. Westminster, London.

Sanford, S., and S. Evans. 1995. Peanuts: Background for the 1995 farm legislation. Econ. Res. Serv., USDA, Agric. Econ. Rept. No. 710.

Shanghai Translation Press. 1985. A New English-Chinese Dictionary. Shanghai, China, pp. 1685-1686.

Sharples, J. A. 1990. Cost of production and productivity in analyzing trade and competitiveness. Amer. J. Agric. Econ. 72:1278-1281.

Sharples, J. A., and N. Milham. 1990. Longrun competitiveness of Australian agriculture. Econ. Res. Serv., USDA, Foreign Agric. Econ. Rept. No. 243.

Sumner, D. A. 1986. The competitive position of southern commodities: Some trends and underlying forces. South. J. Agric. Econ. 18:49-59.

Thurow, L. 1992. Head to Head: The Coming Economic Battle Among Japan, Europe, and America. William Morrow and Co., New York, pp. 90-130.

USDA. 1992-93. Economic indicators of the farm sector: Costs of production—Major field crops & livestock and dairy. Econ. Res. Serv., ECIFS 12-3 and ECIFS 13-3.

USDA. 1995a. Crop production: 1994 summary. Nat. Agric. Stat. Serv., Cr Pr 2-1(95), Jan.

USDA. 1995b. World oilseed situation and outlook. Econ. Res. Serv., Foreign Agric. Serv., Circ. Series FOP 2-92.

Accepted 30 Oct. 1996