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APPLEBAUM SCHOLARSHIP PAPER

Cost, Input, and Market Survey Results Of the Texas Food Processing Industry

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State governments are concerned with economic development because the condition of their well being determines residents' standard of living. Therefore, state governments are interested in strategies for strengthening their economies. States with substantial agricultural production can implement a strategy of maintaining or increasing markets for that production, positively affecting all of the aforementioned measures. In some states, the focus has been to "add value" to raw agricultural commodities.

Texas's food processing industry is the focus of this research. A survey was conducted to determine the cost components of Texas food processors, the percent of purchases from Texas, and reasons for these purchases. This article summarizes the results of this survey.

Introduction

State governments are understandably concerned with the condition of their economies--the economic environment in a state determines the standard of living its residents can attain. Governments of states which receive a substantial proportion of their revenue from agricultural production have the additional consideration of maintaining or increasing markets for that production. In some of these states, the focus has been on "adding value" to raw agricultural commodities (Capps, Fuller, and Nichols). In general, value-added opportunities are important because they increase returns to factors of production, thus enabling firms to grow. As new sources of economic activity for a region or state, these opportunities are also sources of increased jobs, employment, and government revenues (Nichols).

Specific information about the cost components of the food processing industries, preferences of food processors for in- or out-of-state commodities, and the reasons for these preferences is required to determine the ability to expand Texas food processing. This

information generally can only be obtained by surveying food processors. This paper discusses the Texas food processing industry by describing survey results pertaining to cost, input, and market components.

The Sample

A list of Texas food processors is available in the *1990 Directory of Texas Manufacturers* compiled by the Bureau of Business Research at the University of Texas at Austin. For this research, the population of Texas food processors consisted of 1,175 plants listed in the *1990 Directory of Texas Manufacturers* that manufactured products classified under Standard Industrial Classification (SIC) code 20, food and kindred products. The *1990 Directory of Texas Manufacturers* lists up to five different products produced for each plant, but does not give the percentage of total sales for each product. Therefore, the plants listed in the *1990 Directory of Texas Manufacturers* were classified based on the first product listed on the assumption that this product would be produced in the largest volume. Wildenthal compares the characteristics of the plants listed in the *1987 Census of Manufactures* with those listed in the *1990 Directory of Texas Manufacturers* and finds that the percentages of plants in each category for both sales and employment are quite close, supporting the use of the *1990 Directory of Texas Manufacturers* list of food processing plants as the cornerstone of the survey.

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Questionnaire Design

The questionnaire for this research was designed to collect the following information about Texas food processing: (1) description of the cost components of food processing industries; (2) reasons for input purchases from Texas versus out-of-state; (3) the distribution of processed food products among various markets; and (4) the proportion of the output sold in Texas. Due to cost and survey complexity, personal and telephone surveys were not considered as methods of questionnaire administration. Therefore, the survey was designed as a mail survey. The chief executive officer, as opposed to the purchasing or sales agent, of each plant was the recipient of the survey because questions relate to both sales and purchases.

Surveys from the University of Washington, the Nebraska Department of Labor, the University of Illinois, the Texas A&M University System, and the University of Wisconsin were reviewed during questionnaire development. Our survey asked for: plant sales; purchases; employment; capital expenditure information; a listing of major raw materials and inputs and whether or not and why they were purchased inside or outside of Texas; and investment in entrepreneurial activities. The question content, response format, and question sequence were patterned after those of the questionnaires discussed above. The questionnaire was revised based on pretests with a local ice cream manufacturer, baker, and meat processor.

Questionnaire Administration

The printed eight-page questionnaire was mailed with a nonpersonalized cover letter signed by Texas A&M University professors recognized by many of the Texas food processors. Confidentiality and anonymity of questionnaire respondents were assured. A deadline was given for a response, and the respondents were asked to indicate if they wished to receive a copy of the questionnaire results. Three follow-up questionnaires were mailed, and all questionnaire recipients who had not responded were then called. The complexity, time requirements, and length of the questionnaire were more than would generally be considered acceptable for a mail survey, however. As a result, the response rate was lower than otherwise would be desirable.

Survey Respondents

Of the 1,175 plants in the Census, only 999 were found to be currently operating food processing plants. Responses were received from 186 plants, a 19 percent response rate. This response rate is not atypical (Mautz and Neumann; Dommeyer).

Comparison of the Population and Questionnaire Respondents

Comparison of the population and questionnaire respondents is important because of the possibility of reaching incorrect conclusions from nonrepresentative respondents (Tull and Hawkins). The comparison of the population of Texas food processors and the questionnaire respondents is conducted based on simple descriptive statistics for food industry, size, and geographic distribution as well as by using a qualitative choice model to determine the representativeness of the sample.

Descriptive Statistics Of the Population and the Sample

The Texas food processing population for this research is defined as the plants listed in the *1990 Directory of Texas Manufacturers* whose products can be classified in SIC 20, food and kindred products. Wildenthal shows in detail that the percentage of responding plants in each Texas Input-Output Classification (TIOC) is similar to the distribution of population plants for both food processing industries and for number of employees. Due to the large percentage of Texas plants that did not release their sales information to the *1990 Directory of Texas Manufacturers*, the representativeness of the questionnaire respondents in terms of sales volume is not assured. The percentage of responding plants in the Far West/Panhandle and Central regions is very close to the percentage of plants in the population located in those regions, while the percentage of responding plants in the East and South regions is slightly higher than the percentage of plants in the population located in those regions.

Qualitative Choice Model

Response bias in a sample occurs when some people being surveyed are more likely to respond than others. A statistical way of examining the response bias of the sample is through the use of a qualitative choice model. The decision of a food processor to respond to a questionnaire is the dependent variable in a model. The food processor characteristics of interest are: (1) food industry, (2) number of employees, (3) sales volume, and (4) geographic location.

The qualitative choice analysis, its assumptions, and specific procedures are explained in detail by Wildenthal. Plant characteristics of employment, location, and sales did not have a statistically significant impact on whether or not a food processor completed the survey. With respect to food processing industries, beverage, meat processing, and grain milling plants

were more likely to complete the survey than were "other" food processors; while bakery, poultry, preserved food, feed, and dairy processors were less likely to complete the survey. Perhaps in future studies, bakery, poultry, preserved food, feed, and dairy processors may need to be oversampled in order to obtain a more representative sample.

Questionnaire Results

As stated in the questionnaire description, the desired information can be classified into four different categories: (1) descriptions of the cost components of food processing industries; (2) reasons for input purchases from in Texas or out-of-state; (3) the distribution of Texas food products between various markets; and (4) the proportion of the output sold in Texas.

Cost

The cost components for the responding Texas food processing plants are shown in Table 1. These cost breakdowns provide an estimate of the impact of a food processing plant being introduced into a community. The importance of each category of input can be assessed for typical plant cost components. In this way, if an input category is found inferior or superior to out-of-state inputs, a better assessment of the costs and benefits of changing or promoting the input can be determined.

For the purposes of this discussion, inputs are classified into four categories. Inputs with SIC codes below SIC 20 are classified as raw materials. These inputs include raw agricultural products and minerals. Inputs in SIC 20, food and kindred products, are classified as processed food inputs. Those with SIC codes above 20 are classified as nonfood inputs. These inputs include packaging materials, paper products, food preservatives, vitamins, and other materials. The final category is "other materials" purchased such as cleaning supplies.

Of particular interest to an agricultural community is the percentage of resources spent on raw products and the percentage of these raw products purchased locally. Some anomalies are revealed in examining Table 1. For example, beverage plants do not appear to purchase energy or water, or to have depreciation expenses. While there are problems with the collected data, some generalizations on raw material purchases can be made. Most expenditures are weighted more toward materials (raw materials, processed food inputs, processed nonfood inputs, and other materials) than nonmaterial inputs (wages/salaries, overhead, depreciation, other production costs, energy, and water). The exceptions are meat and beverage plants,

whose expenditures are distributed almost equally between both costs. The material expenditures of dairy and preserved food processing plants are weighted more heavily toward raw ingredients, while those of meat, bakery, and other food processing plants are spent more on processed food inputs. Beverage plants purchase more processed nonfood than other inputs, and feed manufacturers spend more on other materials.

Percentage of Materials Purchased in Texas

Also of interest in this research is the percentage of money spent for out-of-state inputs. This money might be redirected toward Texas input purchases, thus strengthening the Texas economy. If a plant is being encouraged to locate in Texas, the availability of inputs is also a consideration. The percentage of raw ingredients, processed food, nonfood, and other materials purchased in Texas by responding Texas food processors is shown in Table 2. These figures indicate which input categories have the greatest potential for increased purchases in Texas. This information can be helpful in explaining reasons the responding food processing plants give for why they purchase inputs from in- or out-of-state sources. Note that neither poultry nor grain mill plants responded to this section of the questionnaire, so comments from these industries are not reported.

Raw ingredients. Responding dairy, feed, and beverage processors purchase nearly all of their raw ingredients from Texas suppliers. Responding meat processors do not purchase raw ingredients from Texas. This fact results from the nature of the responding meat processors, who do not slaughter animals but purchase meat that they further process. This processed meat is classified under processed food inputs for this research. Bakery, preserved food, and other food processors purchase one quarter to one half of their inputs from Texas suppliers, and the reasons for these purchase decisions merit further investigation.

Processed food inputs. Responding dairy, feed, and beverage manufacturers buy approximately eighty percent of their processed food inputs from Texas suppliers, while meat processors purchase half from Texas sources. Bakeries, preserved food, and other food processors purchase less than one-fourth of their processed food inputs from Texas suppliers, and more research on the reasons for these purchase decisions is warranted.

Processed nonfood inputs. Responding bakeries, preserved food processors, beverage bottlers, and meat packers purchase at least half of their processed non-

Table 1 Distribution of Total Cost by Cost Components for Responding Texas Food Processing Plants, 1989

Material	Food Industry							All
	Meat	Dairy	Feed	Bread	Prsv. Food	Other Food	Bever-ages	
	------(Average Percent of Total Cost)-----							
Raw Ingredients	3.7	59.8	14.9	9.2	29.0	0.8	10.0	15.1
Processed Food Products	37.1	5.4	23.7	40.3	19.4	78.3	15.0	56.4
Processed Non-food Prod.	4.8	13.6	6.7	6.5	18.9	4.3	22.5	7.8
Other Materials	4.6	1.7	38.6	7.0	6.7	0.2	2.5	2.0
Wages/Salaries	28.6	7.6	7.0	17.8	10.2	6.8	12.5	7.7
Overhead	13.4	2.9	1.5	8.5	3.9	4.2	25.0	4.1
Depreciation	1.8	2.1	1.8	3.3	4.7	1.3	0.0	1.9
Other Production Cost	2.3	4.3	3.7	6.0	4.2	1.9	12.5	2.7
Energy	2.8	2.0	1.8	1.4	2.4	2.1	0.0	2.1
Water	0.9	0.6	0.3	< 0.1	0.6	< 0.1	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculations by the author from survey results.

Table 2 Average Percentage of Purchases from Texas Suppliers by Responding Texas Food Processing Plants, 1989

Materials	Food Industry ¹						
	Meat	Dairy	Feed	Bread	Prsv. Food	Other Food	Bever-ages
	------(Average Percent of Purchases in Texas)-----						
Raw Ingredients	0.0	100.0	90.7	45.9	30.1	26.2	100.0
Processed Food Products	54.0	79.6	82.6	8.1	22.6	0.3	83.3
Processed Nonfood Products	51.5	31.6	25.2	95.8	90.1	29.7	77.8
Other Materials	18.9	57.0	54.7	48.5	67.6	31.8	0.0

Source: Computations by the author from survey results.

¹ Poultry and grain milling respondents did not provide this information.

food inputs from Texas suppliers, while feed, other food, and dairy processors buy one quarter to one-third of their processed nonfood inputs from Texas sources. The reasons these latter three food processing industries purchase their input out-of-state deserves to be more fully investigated.

Other Materials. Approximately half of the responding dairy, feed, bakery, and preserved food processors inputs are provided by Texas suppliers. None of the beverage bottlers' other materials come from Texas sources, while one-third of the other food processors' and one fifth of the meat processors' other materials are bought from Texas suppliers. Therefore, the reasons the latter three food processing industries purchase their other materials from out-of-state merits further investigation.

Reasons for Purchasing Inputs In Texas or Out-of-State

In the previous section, specific food processing industries were identified as having greater opportunities to increase their purchases of Texas products than others. In Table 3, reasons why food processors preferred Texas or out-of-state inputs are identified. With this information, areas in which Texas can improve in order to be more competitive can be identified. However, one area which is not investigated is the possibility that some processors may not purchase out-of-state inputs due to state loyalty. In elaborations of these preferences, poultry and grain mill plants answered questions in this section, but did not answer questions in the previous section on costs.

Availability. One hundred forty plants out of one hundred eighty-six responding plants cited availability as a reason for buying their inputs from Texas suppliers (Table 3). Availability was cited by 20 percent to 75 percent of the responding plants in each food processing industry with only two exceptions. Only one out of the twenty-three responding meat processors cited availability of raw materials as a factor in purchasing these inputs from Texas suppliers. Few of the responding meat processors slaughter animals, so availability of raw materials is not as relevant for this industry as it is for other industries. In addition, only two out of the nineteen responding bakeries cited availability of processed nonfood purchases as factors in purchasing these inputs from Texas suppliers. Many meat, bakery, dairy, and feed processors cited availability as a reason for purchasing processed food

inputs. Similarly, several poultry, bakery, dairy, and feed manufacturers noted availability as a reason for their purchases of local raw materials. Several poultry and beverage processors listed availability as a reason for purchasing processed nonfood inputs in Texas. Except for poultry, over half of all the inputs discussed in this section are purchased from Texas sources.

Availability of inputs was cited as a reason for buying out-of-state inputs by approximately half of the responding food processors (Table 3). Responding grain mills did not check this reason. Availability was important for processed food bought out-of-state by meat packers, for raw materials purchased out-of-state by preserved food processors, and for processed non-food products purchased by beverage bottlers.

The reasons plants listed can be generalized into three different cases of input availability. The first case is when the input in question is available in Texas, regardless of whether it is produced out-of-state. Without considering quality, cost, and other comparisons with out-of-state inputs, Texas input producers just need to make their products available. The second case is when the input is available in Texas, but a processor maintains an out-of-state supplier. Examples of this case include a citrus processor who maintains an out-of-state source in case of a freeze, and a fish processor who maintains a source so he can process fish during the Texas off-season. This behavior is simply following good business sense, and nothing should be done to counteract this behavior. The third case is when an input is not available in Texas and is only available from out-of-state. Examples of these inputs include pork, turkey, packaged seasonings, lollipop supplies, beverage supplies, processed soybeans (which are not processed in Texas due to the small amount of soybeans produced in Texas), and almonds, peppers, and tomatoes, which are not generally grown in Texas. These situations warrant further investigation into the demand for these products to see if the Texas market can sustain a supplier, as well as the ability to supply some of the products, such as soybeans, almonds, tomatoes, peppers.

Cost. Cost was cited by almost 70 percent of the questionnaire respondents as a reason they buy Texas inputs (Table 3). When cost is cited as a reason for purchase of Texas inputs, it is possible that quality and transportation are factors involved in the cost. The specific cost influences of Texas purchases by poultry, feed, bakery, and beverage plants should be further investigated in order for plants to locate in Texas. The food processing industries that indicated cost was a factor in their decision to purchase out-of-state inputs did not list specific ways as to how cost was a factor in their input purchases. With only three exceptions, a

**Table 3 Major Reasons for Buying Materials Cited by Texas Food Processing Plants, 1989
(186 Responding Plants)***

Reason	Number of Times Cited	Percent of Total Reasons Cited	Number of Plants Citing this Reason	Percentage of Plants Citing This Reason
Availability				
In State	406	32.2	140	75.3
Out of State	215	36.0	91	48.9
Cost				
In State	365	28.9	129	69.4
Out of State	148	24.8	72	38.7
Quality				
In State	199	15.8	80	43.0
Out of State	118	19.7	57	30.6
Transportation				
In State	202	16.0	80	43.0
Out of State	22	3.7	11	5.9
Sole Source				
In State	42	3.3	33	17.7
Out of State	52	8.7	38	20.4
National Contract				
In State	19	1.5	10	5.4
Out of State	27	4.5	12	6.5
Made by Affiliate				
In State	12	1.0	11	5.9
Out of State	8	1.3	6	3.2
Other				
In State	16	1.3	12	6.5
Out of State	8	1.3	6	3.2
Total				
In State	1261	100.0	186	
Out of State	598	100.0	186	

* Each plant could check each reason for any of its primary six materials, labor, or depreciable fixed assets--thus, each reason could be checked up to 8 times per plant. The second column represents the total number of times that the reason was checked divided by the total number of reasons checked.

food processor from each food industry cited cost as a reason for purchase of either raw materials, processed food inputs, or processed nonfood inputs from out-of-state sources. Any of these reasons may be investigated, but the feed, bakery, and other food industries consistently had more than one processor citing this reason for each type of input. Dairy processors cited cost as a reason for the out-of-state purchase of processed food and nonfood inputs, and these reasons could be part of an initial study as well.

Quality. Forty-three percent of the responding plants cited quality as a reason for buying Texas inputs (Table 3). A plant's opinion of input quality is a major factor that could be influenced by state loyalty. This factor may be important for the plants that cited quality as the reason for purchasing Texas inputs, and might deter plants from searching for out-of-state input substitutes. Feed, bakery, preserved food, and other food processors exhibit the main concern for quality of each type of out-of-state inputs, while meat processors cite concern for the quality of out-of-state processed food inputs. These areas warrant further investigation for ways Texas can improve its products. Aspects of Texas input quality valued by beverage, meat, dairy, and bakeries should be pursued for purposes of promoting Texas inputs.

Transportation. Transportation availability and cost was also cited by 43 percent of the responding plants (Table 2). Poultry processors were the only processors who did not cite transportation as a consideration for any input purchase. Texas freight rates appear to be favorable for some items and unfavorable for others. Reasons given by Texas dairy, grain, and feed processors for favoring Texas inputs for transportation reasons deserve further investigation. Few of the food processors have problems with Texas transportation. However, feed mills' transportation considerations warrant further study. Other factors to consider include processed food transportation of meat and preserved food processors, raw material transportation of dairy and other food processors, and processed nonfood transportation of other food processors.

Sole source. Approximately one-fifth of all responding food processors cited sole source of inputs as a reason for buying either Texas or out-of-state inputs (Table 3). The existence of a sole source is favorable when the source is in Texas, and unfavorable when the source is outside of Texas. The existence of a Texas sole source for an input could be promoted to new food processing plants. When the only source of an input is outside of Texas, more work must be done

to entice the source to move to Texas. Currently, few plants have sole sources outside of Texas.

National contract. National contracts for Texas inputs were cited by only five percent of the responding food processors. National contracts restrict input purchases from out-of-state suppliers for only 6.5 percent of the responding food processors (Table 3). National contracts are similar to sole sources in that they are favorable if the national contract is with a Texas supplier, and unfavorable if the contract is not with a Texas supplier. For example, a beverage plant noted that its decisions were controlled by the corporate office. In such situations, there is no benefit to be gained from promoting the existence of national contracts for Texas inputs; the existence of national contracts is a difficult situation for Texas input entrepreneurs to overcome. Few plants are purchasing inputs out-of-state due to this reason.

Made by Affiliate. Approximately seven percent of the food processors purchased Texas inputs that were made by affiliates (Table 3). Only three percent of the responding food processing plants purchased out-of-state inputs because they were made by an affiliate (Table 3). As with sole sources and national contracts, inputs made by affiliates are favorable if the affiliate is located in Texas, and unfavorable otherwise. Also similar to national contracts, there is no benefit to promoting the existence of an affiliate; affiliate input transactions are difficult for Texas entrepreneurs to attract. It is difficult to encourage affiliates to move to Texas. Similar to national contracts and sole sources, currently there are few plants that purchase out-of-state inputs made by affiliates.

Other Reasons. Seven percent of the responding food processors listed other reasons for buying Texas inputs (Table 3).

Markets for Texas Food Products

The importance of markets lies in the distinction between final demand markets versus processing markets. When products are sold to final demand, value can no longer be added to them. When they are sold to processing markets, more value is added to the products. In this way, more wages and salaries, interest, taxes, and the other components of value-added are generated for the economy.

The markets of interest are listed in Table 4. Using the input-output definition, final demand markets are export markets and state, local, and federal governments. Most of the markets listed under "other markets" are final demand markets, as well. Retail firms,

Table 4 Distribution of Respondents' Sales of Texas Food Products by Market, 1989

Markets	Food Industry								
	Meat	Poultry	Dairy	Grain	Feed	Bread	Prsv. Food	Other Food	Beverages
------(Percent of Sales)-----									
FINAL DEMAND									
State/ Local Govt.	1.5	0.3	1.8	< 0.1	1.2	0.0	0.3	0.1	0.0
Federal Govt.	1.5	0.0	1.1	0.4	0.0	0.2	0.4	0.1	< 0.1
Exports	2.2	0.0	1.1	83.6	0.2	3.9	0.1	1.4	0.0
Other Markets	0.4	3.0	0.7	0.1	45.2	39.1	1.7	13.4	0.1
VALUE-ADDING MARKETS									
Retail Firms	35.0	32.9	53.0	5.9	36.7	7.4	34.3	9.0	50.0
Hotel/ Rest.	18.6	6.6	5.1	0.7	0.0	2.3	0.5	2.4	< 0.1
Institu- tions	3.8	0.4	5.9	1.2	< 0.1	0.9	1.9	0.1	< 0.1
Other Whole- salers	21.5	2.2	0.2	6.9	7.2	39.0	34.2	21.6	< 0.1
Brokers	0.0	< 0.1	0.0	0.2	< 0.1	5.3	5.9	0.4	< 0.1
Co. Distri- bution Facility	5.8	48.9	23.2	0.1	9.0	1.9	13.7	28.6	49.9
PROCESSING									
Proces- sors	9.7	5.7	7.9	0.9	0.4	0.0	7.0	19.6	0.0
All Markets	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Computations by the author from survey results.

hotels, restaurants, institutions, other wholesalers, brokers, processors, and company distribution facilities, add value to products.

The grain mill sector is the only sector where most of the production goes mainly to final demand (84.0%). The meat, dairy, and bakery industries sell roughly five percent of their production to final demand markets. The remaining sectors, however, sell two percent or less of their production to final demand markets. Therefore, given an equal ability of food processing industries to adapt to the community, food processing industries other than the grain mill industry would be chosen for investment.

Further processing of Texas food production occurs for less than twenty percent of the output in each industry. Almost twenty percent of the "other food" products are further processed. None of the bakery or beverage products are further processed. However, bakery processors use grain mill products as inputs, so their production generates further economic activity within the food processing sector. Less than ten percent of the remaining industry products are further processed. Given these circumstances, "other food" products would be the targeted industry to increase employment and income from further processing of food products.

Another important aspect of markets is how much production is sold to out-of-state processing firms. Table 5 shows the converse of this situation, namely, how much of the production is sold to Texas buyers. The value of this knowledge relates to the desire for further value to be added to commodities in Texas. For example, all of the animal feed that is sold to processors is sold to Texas processors, but for obvious reasons, very little animal feed is sold for further processing. Relative to other food industries, slightly more of the grain and preserved foods are sold to further processors, with most of this production being sold to Texas processors as well. Between five and twenty percent of the remaining products are sold to processors, with between 70 and 99 percent of that production being sold to out-of-state processors. These figures indicate that there is an opportunity to further process the production of these latter industries, namely the meat, poultry, dairy, and "other food" industries. Further study should be undertaken to see what expected dollar value of commodities are under consideration, and the circumstances of their processing.

Conflicting with the previously stated desire to increase the amount of production that is further processed is a desire to sell more to final demand markets out-of-state. Due to the small quantity of production that is sold to final demand and the large percentage of sales of these sectors to Texas firms, most of the final demand sales are sold to Texas buyers.

Suggestions for Future Research

This research has investigated food products at a very general food classification level. An initial starting point would be to select one of these general food processing industries for further study, and evaluate the food products at a more detailed level of SIC classification. For example, if the meat industry were chosen, beef, pork, lamb, veal, sausage, and other meat industries would be evaluated in greater detail to see which, if any, would have positive impacts on the Texas economy if operations were expanded.

Other research relates to further investigation of general reasons that food processors indicated were factors in their decisions to purchase inputs in Texas or out-of-state. These reasons merit further investigation because they point out areas in which Texas can improve its input or can promote its inputs to potential buyers (new food processing plants). Further investigation into the destination of exports is warranted in order to determine if exported products are further processed, and whether any of this further processing could occur in Texas.

Conclusions

Many state governments are interested in investigating opportunities to increase state output, income, and employment. This research has presented survey results on costs, inputs, and markets of the Texas food processing industry. While further research will definitely be useful, this information will aid researchers in organizing a plan for further research that investigates specific food processing plant opportunities.

References

- Capps, O. Jr., S. W. Fuller, and J. P. Nichols. "Assessing Opportunities in Food and Fiber Processing and Distribution." *American Journal of Agricultural Economics* 70(1988):462-468.
- Dommeyer, C. J. "Does Response to an Offer of Mail Survey Results Interact with Questionnaire Interest?" *Journal of Market Research Society* (1985):27-38.
- Mautz, R. F. and F. L. Neumann. "The Effective Corporate Audit Committee." *Harvard Business Review* (1970):58.
- Nichols, J. P. *Food Industry Trends in the Southwest: Size, Structure, and Value-Added*. Presentation to the Texas Food Processors Association Annual Meeting, April 28, 1988, San Antonio, TX.

Tull, D. and D. Hawkins. *Marketing Research: Measurement and Method*. New York: Macmillan Publishing Company, 1987.

Wildenthal, M. *Opportunities for Enhancing the Texas Food Processing Industry*. Ph.D. Dissertation, Texas A&M University, 1992.

Table 5 Percentage of Respondents' Sales of Texas Food Products to Texas Destinations, 1989

Markets	Food Industry								
	Meat	Poultry	Dairy	Grain	Feed	Bread	Prsv. Food	Other Food	Beverages
------(Percent of Sales)-----									
FINAL DEMAND									
State/Local Govt.	24.5	100.0	100.0	38.0	81.4	0.0	40.5	83.5	0.0
Federal Govt.	19.4	0.0	100.0	0.0	0.0	100.0	46.0	6.6	100.0
Exports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Markets	90.6	70.0	100.0	92.5	96.8	30.5	61.7	1.6	100.0
VALUE-ADDING MARKETS									
Retail Firms	54.6	100.0	97.5	50.8	85.5	82.1	60.6	26.5	15.1
Hotel/Rest.	61.3	100.0	99.7	42.9	0.0	93.6	90.5	9.3	100.0
Institutions	34.1	100.0	95.6	83.2	100.0	100.0	70.7	47.2	80.2
Other Wholesale-salers	63.1	50.1	80.0	4.5	63.3	60.6	62.4	7.4	51.2
Brokers	0.0	0.0	0.0	20.0	100.0	20.0	10.0	52.0	100.0
Co. Distribution Facility	100.0	0.0	59.5	75.0	99.4	100.0	47.4	75.3	0.1
PROCESSING									
Processors	20.7	1.0	6.9	80.0	100.0	0.0	61.6	30.5	0.0

Source: Calculations by the author from survey results.